

Yale (L.M.)

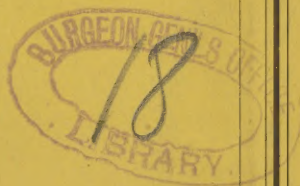
A REPORT
OF THE
EPIDEMIC OF CHOLERA

OCCURRING ON
BLACKWELL'S ISLAND,
NEW YORK,
IN THE SUMMER OF 1866.

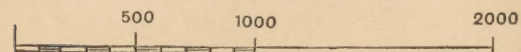
BY
✓
LEROY MILTON YALE, M. D.,
LATE OF THE RESIDING STAFF.

LIBRARY.
464548
Washington, D.C.
[FROM ANNUAL REPORT OF COMMISSIONERS OF PUBLIC CHARITIES
AND CORRECTION.]

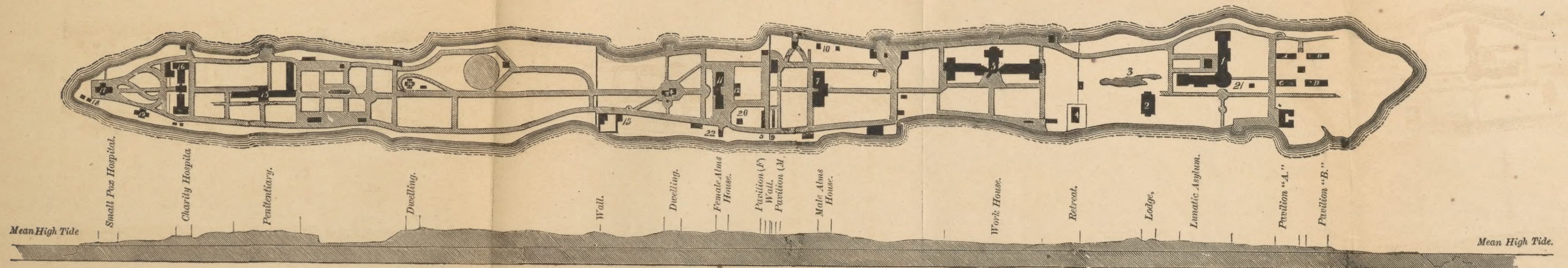
NEW YORK:
FRANK McELROY'S MERCANTILE STEAM PRINTING ROOMS,
113 NASSAU STREET.
1867.



BLACKWELL'S ISLAND.



Longitudinal Scale, 800 Feet to the Inch
Vertical Scale, . . . 160 Feet to the Inch

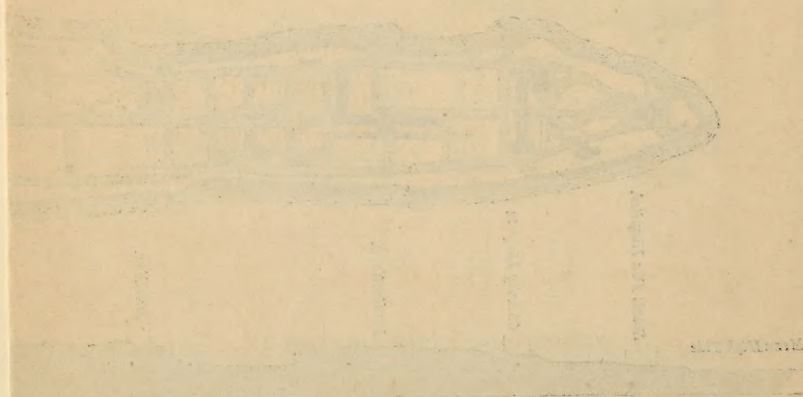


- | | | | | | |
|--------------------|------------------------------------|------------------------|-----------------------|-------------------------|--------------------------|
| 1. Lunatic Asylum. | 5. Work House. | 9. Female Pavilion. | 13. Dwelling. | 17. Small Pox Hospital. | 21. Gymnasium. |
| 2. Lodge. | 6. Room used for Cholera Hospital. | 10. Male Water Close. | 14. Dwelling. | 18. Cholera Tents. | 22. Female Water Closet. |
| 3. Pond. | 7. Male Alms House. | 11. Female Alms House. | 15. Penitentiary. | 19. Fever Hospital. | 24. Dwelling. |
| 4. Retreat. | 8. Male Pavilion. | 12. Wash House. | 16. Charity Hospital. | 20. Cholera Tents. | |

RECORD OF CHOLERA

1867-1868

1867-1868



The following table shows the number of cases of cholera which occurred in the city of New York during the years 1867 and 1868. The table is divided into two columns, one for each year, and the rows are headed by the names of the different districts or wards of the city. The numbers in the table represent the total number of cases for each district in each year.

District or Ward	1867	1868
Manhattan	1234	567
Brooklyn	876	234
Queens	456	123
Richmond	321	98
Staten Island	210	54
Total	2897	1076

RECORD OF CHOLERA

ON

BLACKWELL'S ISLAND.

TO FRANK H. HAMILTON, M. D.,

*Chairman of the Committee of Inspection of Medical
Board of Charity Hospital :—*

DEAR SIR—In accordance with directions given me, by you, “to receive from the several departments the various cholera reports, to be verified and consolidated,” the following report has been prepared, and is respectfully submitted.

The reports received are as follows :—

For the *General Hospital, Penitentiary and Ward's Island*
—From Dr. JOSEPH O'DWYER, Sanitary Superintendent
General Hospital.

For the *Almshouse*—From Dr. LYMAN WARE, in charge.

For the *Workhouse*—From Dr. RICHARD L. SYKES, in
charge.

For the *Lunatic Asylum*—From Dr. R. L. PARSONS, Resi-
dent Physician.

In discussing the epidemic, the following order may be advantageously adopted :

1st. What was its clinical history, and what were the post-mortem appearances?

2d. Where was its point of origin, and what its course of spread?

3d. What circumstances existed which might act as accessory causes for its initiation, or continuance?

4th. What hygienic measures were adopted for its suppression, and with what success?

5th. Therapeutics.

First.—(a.) The *clinical history* of this epidemic need not be dwelt upon at any length, since, as far as observed, it differed in no material point from that of other epidemics with which every one is familiar. Enough, however, of its characters may be mentioned to establish it as truly epidemic cholera.

First, in a large proportion of cases—precisely what proportion cannot now be ascertained, but certainly a majority—"premonitory diarrhoea" existed. This diarrhoea varied in its duration from a few hours to a few days. Very often it was neglected partially or wholly, as

of no importance; or, later in the epidemic, concealed by the sick for fear of being sent to the cholera ward if discovered.

Succeeding to this "premonitory diarrhoea" were the dejections commonly known as "rice-water;" together with copious vomiting of a watery fluid. The "rice-water" discharges were stained of a variety of colors, sometimes of muddy hue, at others greenish, bluish, red or black; while again they remained nearly as colorless as pure water, or a pale amber like serum of the blood. The thirst was excessive, or even quite insatiable; the drink almost immediately rejected. Muscular cramps generally occurred quite early; usually confined to (1st) the extensor, and (2d) flexor muscles of the leg and foot; occasionally appearing in the abductors of the thigh; very rarely in the abdomen, or upper extremities, or face.

Upon these symptoms, in the unfavorable cases—which, unfortunately, were the large majority—those of collapse speedily supervened: namely, marked interference with the circulation, shown by the pulse, rapid, and often unrecognizable at the wrist; by the coldness and lividity of the lips, tongue, and surface the patient meanwhile complaining of insufferable heat; in addition, the shrivelled, inelastic skin, the sunken eye, with its injected conjunctiva, the pinched features, and the peculiar, almost

pathognomonic *vox cholericæ*. The combination of these symptoms—the stage of collapse namely—usually heralded a speedy death. For, of the twenty-five per cent. that recovered, quite a large part had not passed into the stage of collapse.

Very few, if any, cases presented the symptoms usually described as constituting the stage of reaction. Of those who escaped collapse, some recovered speedily so as to be able, in a day or two, to attend to their usual duties, or to nurse the sick; while others of these, together with those to whom the stage of collapse did not prove immediately fatal, remained in a state either typhoid or of great debility, with such irritability of stomach as to prevent the retention of food. A large proportion of these died, the remainder convalesced more or less slowly, some not having recovered their usual health after the lapse of two months.

The usual clearness of intellect continued throughout the attacks in nearly every instance.

The average duration of attack at Asylum is stated as fifty-six hours. For the other institutions it is not definitely stated, but would probably be not longer than forty-eight hours.

The peculiar post-mortem muscular contractions were often noticed.

(b.) The *post-mortem appearances* are described in the following letter from Dr. J. Lewis Smith :

“DEAR DOCTOR.—Your note requesting me to furnish you any interesting or useful facts which I may have observed in reference to the recent epidemic of cholera on Blackwell’s Island, has been received. I do not know that I can send you any particulars with which you are not already familiar, except the post-mortem appearances. During the epidemic, I made, or witnessed, about twenty autopsies of cholera cases, most of which were on the island, but a few in Bellevue Hospital (a little more than twenty in all, according to my recollection, for I preserved no records), and I will state briefly the appearance and condition of the fluids and viscera so far as I examined them.

“*The blood* was in all cases very thick and dark, like treacle. Its specific gravity was never less than 1058, and was ordinarily between this and 1065. Unfortunately, the urinometer which I used was not graduated so as to indicate the specific gravity in the cases in which the blood was thickest ; but I think it did not exceed 1070 in any of those examined. Clots, usually dark, were found

in the cavities of the heart; and the blood, which I examined with the microscope, was always taken from this organ, kept in a closely-corked bottle, and examined soon afterwards.

"I did not notice, as a rule, any relative increase in the number of white corpuscles, as stated by Virchow. The largest proportion which I observed was one white corpuscle to from thirty to forty blood discs, while ordinarily the proportion was much less. The discs were usually aggregated so as to slowly move in masses across the field of the microscope, when considerable inclination was given to the slide. The white corpuscles, on the other hand, were usually single; in one or two instances, I found these bodies aggregated, but then, I concluded, I was examining fragments of clots from the ventricle.

"The shape of the blood discs was very irregular. Some were serrated, others apparently compressed, and others, still, of natural form. I believe the size of all was somewhat diminished from exosmosis. In one case I found blood crystals (hæmatoidine) mixed with the discs, although not numerous. From the deficiency of serum, and aggregation of the blood discs, the state of the blood was such that it must have been very much obstructed in the capillaries; the aggregate amount of blood was also much diminished.

“In all the examinations on the Island we found a large amount of liquid in the stomach and intestines; and I believe the same was true in Bellevue Hospital. This is an important fact, since some recent writers have attempted to show that death in this disease does not occur from the loss of the liquid portion of the blood, reasoning from the fact that some die without a sufficient number of evacuations to diminish materially the amount of liquor sanguinis. The quantity of liquid observed in the stomach and intestines in the cases which we examined, afforded sufficient proof that the blood may lose a considerable part of its serum while the evacuations are scanty.

“This liquid sometimes had the appearance of rice-water, sometimes a dirtier color, like dish-water, and sometimes it was tinged by the coloring matter of the blood. In no case—certainly in no recent case—was it at all *fæcal*; it had the peculiar musty odor which characterizes the evacuations in this disease.

“In a few instances I made microscopic examination of the fluid in the small intestines. The floculi seemed to consist largely of epithelia, more or less disintegrated. I also observed, occasionally, blood crystals, and other crystals which I supposed to be those of the salts con-

tained in the blood, and which had escaped from the vessels with the serum.

“The *peritoneum* sometimes seemed more dry than in the healthy state; but, in other cases, there was no notable alteration in the membrane.

“The *intestines*, viewed externally through the peritoneum, presented an injected appearance, more so than I have seen in any other disease. This injection was usually more marked in the small intestine than in the stomach or colon; and frequently it was also observed in the mesentery. The gastro-intestinal mucous membrane, in all cases, unless one, was highly injected. This appearance was sometimes observed in every division of the digestive tube below the cardiac orifice of the stomach. It was always present, unless in the excepted case, in the small intestine, and ordinarily present in the colon; while, though common, in the stomach, it was oftener absent here than elsewhere. Whenever absent (the injection) the mucous membrane usually presented a pale, sodden and thickened appearance, as if from maceration. In recent cases, the color of the injected surface was a bright red; and this fact we considered an argument in favor of its inflammatory rather than simply congestive character. Moreover, in simple congestion, we would

expect more continuous vascularity than was observed in many of these cases.

" Sometimes, but not in all cases, the solitary follicles and Peyer's patches were considerably elevated and enlarged, but in no examination were they found ulcerated.

" The bladder was uniformly nearly, or quite, empty. Scantiness, or even absence of urine was observed in the cases treated on Blackwell's Island, as it has been elsewhere. In one case in this city, occurring in private practice, the patient lived five days without voiding any urine during that time. It seems now well-established that retention of urine is a frequent cause of death in cholera cases. The arrest of the urinary secretion is readily explained by the diminished fluidity of the blood.

" The lungs and solid organs presented no unusual appearance, except such as was due to the dark color, and the altered consistence of the blood ; unless in one case, examined about twelve hours after death, in which we found one or two bubbles in a cerebral vein, and in regard to which the question arose whether it was not carbonic acid, since the quantity of this gas is, doubtless, greatly in excess in those who die of cholera.

" Yours truly,

(Signed) J. LEWIS SMITH.

Second.—Its point of origin and course of spread.

It will be proper to mention here three cases, which, before the cholera had assumed an epidemic form, had occurred, apparently sporadically, at the Charity Hospital.

These were :

1st. *John McGowan*, who had been for six weeks under treatment for ulcer in Male Ward 8, was seized, on the 9th day of July, with cholera, the discharges being quite characteristic. The patient recovered. The only predisposing cause that could be suggested in his case, was that he had been for nearly a year troubled with attacks of diarrhœa; and that one of these, of a week or ten days duration, had immediately preceded that of the cholera. During the whole season no other cases appeared in this Ward

2d. Eleven days later, on the 20th of July, *James Hatton*, a deck hand on the steamer "Bellevue," and who had been suffering for some days from some form of bowel complaint, was brought from the dock to Ward 5, in a state of collapse, and died the next morning at five o'clock. As far as can be ascertained he had had no connection with any other case of cholera, or cadaver dead of that disease.

3d. July 22d, the day following Hatton's death,

Thomas Conroy, while employed as nurse to a surgical patient, in a tent midway between the fever and small-pox hospitals, was seized with cholera and recovered. He is not known to have had any connection with either of the previous cases, or with the body of Hatton.

This last case occurred upon the same day as the first at the Work House, but cholera now disappeared from the Hospital for nine or ten days, when it was reached by the epidemic in its spread.

Disregarding, then, these three cases, the first case known to be cholera, and patently connected with the epidemic, occurred in the female (northern) wing of the Work House, on the night of the 22d of July, in the person of *Fanny Little*, terminating fatally in about twelve hours.

The following day a case, fatal in three hours, occurred in Pavilion "B" of the *Lunatic Asylum*, the patient, *Maria Tracy*, having been, till within a day or two, an inmate of the "Retreat" of the Asylum. On the 25th, another appeared in the main building of the Asylum; on the 26th, another in the same locality, with a second in Pavilion "B," and two in the "Retreat." On the midnight of the 26th and 27th, the cholera re-appeared at the Work House with great violence, six-

teen cases becoming developed before the expiration of twenty-four hours.

The relation of these buildings will be understood by referring to the accompanying map, which is a copy of a very accurate one prepared by my friend Dr. Fredrick A. Castle, of the Charity Hospital Staff. It will be seen that the "Retreat" (4) is quite close to the Work House (5). The main building of the Asylum is marked (1), the Lodge, (2), the Pavilions are lettered.

From the 27th it raged at the Work House, and simultaneously, but less severely, at the Asylum. The majority of cases, at first, being in the northern wing in the former institution, and in the "Retreat" in the latter, though none of the various buildings escaped.

The spread of the cholera from the female to the male wing of the Work House, was not rapid, as the following table will show :—

Date.....	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10
Cases, Male....	1*	1	1	21	2	5	11	18	9	6	2	0	1	0	0
Cases Females..	15	11	3	9	10	14	22	12	12	6	2	1	1	1	1

* Sick when admitted to house from City.

On the 30th, the first case at the *Alms House* appeared in the female Pavilion (numbered 9 on the map), which is at quite a distance from the Work House; the buildings connected with the male Alms House having been quite passed over. In this female Pavilion four were seized on the 30th, nine on the 31st, with a single case in the male building. On the following day one case occurred in the female building. For a few days cases still were quite frequent in the Pavilion, but afterward chiefly were among the women in the female building.

In addition to this there was a remarkable mortality among the children at the female Alms House during the prevalence of the cholera.. These are not included in the lists of cases, but Dr. J. Lewis Smith, Visiting Physician to the Charity Hospital, assures me that he is satisfied from the post-mortem appearances, that many of these children died of epidemic cholera rather than from the enterocolitis, and kindred diseases, usually prevalent among them. The testimony of the house physician, Dr. D. W. Searles, is to the same effect. The relative mortality during the prevalence of the cholera and the weeks preceding, as well as during the corresponding months of 1865, is shown in Appendix F.

The cholera had appeared at the *Penitentiary* on the same day as at the Alms House, the 30th of July; but here

it prevailed but slightly, only nineteen (19) cases, with seven (7) deaths, being reported in all.

Its re-appearance at the *Charity Hospital* was on the 31st of July, in the person of Ann Swift, who had that day been transferred from the Work House, where she had, for several days, been in the cholera ward, but with no manifestations of choleraic symptoms. On the 3d of August, Eliza Cowan, with two or three others, who had been under treatment for cholera at the Work House, was transferred to the Hospital as convalescent. Cowan died on the 5th, but in the meantime, on the 3d, 4th, and 5th, quite a number of cases had been developed; on the last named day one case occurring at the Small-pox Hospital. The epidemic had thus reached from one extremity of the island to the other.

The returns of cases, with date of attack and death, number of recoveries, etc., at the Asylum, Workhouse, Almshouse, Penitentiary, and Charity Hospital will be found respectively in Appendixes A, B, C, D and E. .

Before leaving the topography of this epidemic, it is proper to mention a small number of cases occurring among Workhouse and Almshouse inmates employed upon Ward's Island. The first case was on July 27th, the last August 3rd, on which day, I think, all Workhouse

people were sent back. For the list of these cases see Appendix G.

Third.—What circumstances existed which might have acted as accessory causes for its initiation or continuance?

The importance of this head, the great difficulty of determining causes, the great danger of adopting the argument *post hoc ergo propter hoc*, demand that *all* the facts and circumstances discovered, however trivial, which may seem in any way to be influential, should be stated as accurately as possible. On this account some prolixity of detail may be pardoned.

First to be mentioned are some circumstances which would be likely to affect the island at large.

During the first half of July the heat was excessive. Whatever be the nature of the cholera poison, it is generally admitted that such weather is very favorable to its development.

Nearly, or quite, coincident with this "heated term" occurred two accidents calculated to exercise a general influence—1st, the repeated, unavoidable breaking of one of the main pipes across the East river diminished very materially the supply of water to the island, and in some degree interfered with the usual washings, cleansings,

and purifications;—2d, owing either to the flour used, or the influence of the heat upon the yeast, the bread was of a quality far inferior to that generally issued, being sour and doughy. This bread as will be seen by reference to the diet table (Appendix H.) forms quite a large proportion of the food of the inmates, especially at the Alms House.

Simultaneously, whether consequently or not, with this interference with the diet, diarrhœa prevailed throughout the island. At the Charity Hospital I cannot learn that the frequency of intestinal disorders, though considerable, was greater than is usual in the summer season. At the other institutions, however, they were more prevalent; at the Asylum, gradually increasing till the cholera appeared; at the Work House and Penitentiary being sufficiently common to cause the appropriate medicines to be kept in several places in the institution for the convenience of the patients. At the Male Alms House a similar state of affairs obtained. Probably the greatest prevalence was at the Female Alms House. Here, on the 11th of July—excluding the wards for foundlings (40 and 41), where bowel complaints are universal—one hundred and sixty-two cases of diarrhœa were prescribed for, by Dr. Castle, about one half of the number being adults, and the remainder children.

It cannot be ascertained, nor, indeed, is there any special reason to suppose, that this prevalent diarrhoea was choleraic in its character. Nevertheless, its mention is of value, as showing that for some reason a tendency to intestinal troubles existed, which with the aid of the specific cause could easily develop an epidemic of great severity.

The *Local Causes* next deserve attention.

The point of origin of the epidemic, and the fact that its greatest severity during the first week was at the "Retreat," and the female wing of the Workhouse, the proximity of which buildings has already been noticed, suggest the idea of some endemic cause. By referring to the elevation given with the map, it will be seen that both of these buildings occupy considerably lower ground than the Lodge above the Almshouse below.

Moreover, within the Asylum grounds, about equidistant from the Lodge and the Retreat, a pond has formed in the excavation of an old quarry. This pond, though in it had collected sufficient soil for the rooting of bulrushes, and in summer, had, about the margin, a small quantity of green surface vegetation, did not appear to be stagnant, it being supplied by a spring, and the overflow escaping by a waste-way. The water of the pond is slightly impure, but gave rise to no foul order.

These causes, however, seem inefficient. For, had the source of the epidemic been paludal we should hardly expect to find severe visitation and comparative exemption side by side, as, during the first week, at the Work House, though nothing existed to prevent the free circulation of any miasm from wing to wing.

The fact of the almost unprecedented severity of the epidemic at the Work House—about one fifth of the inmates dying of the disease—forces upon us the supposition of some special causes here; and this hypothesis gains probability from the following fact:—

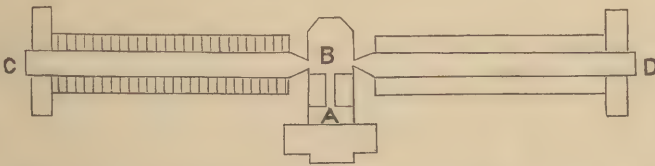
Somewhere between the twentieth of June and the fourth of July (the exact date has, unfortunately, been lost), an epidemic of cholera morbus appeared in the female wing of the Work House. Twenty to twenty-five cases occurred in the first night and day, and about the same number the second, and a few on the third. The male wing was exempt till the third day, when four or five cases occurred; the whole number of cases being about sixty.

At the time I sought for a cause for this difference between the two wings—in the diet, but (though I found in the list several things calculated to produce intestinal derangement) this was identical on both sides of the house

—in the lodgings, but this was practically the same. If in the physical status there was any difference, the advantage was on the side of the females. The cause, then, was finally set down as some endemic, but unknown, influence.

During the three or four weeks that intervened between this epidemic and that of cholera, diarrhœa continued with an occasional attack of cholera morbus, the type in some of the latter cases being quite severe, and, though unrecognized, may have been the initial cases of cholera.

It will be profitable, then, to inquire what were the hygienic conditions of the Work House, and especially how these differed in the two wings.



The diagram above gives the general plan of the Work House. The centre building "A" is chiefly occupied as officers quarters, kitchen, &c. From the northern and southern sides of the scullery "B" extend long halls, 291 feet in length by 24 feet in width. To these air and heat are furnished through a row of gratings, 4 feet by 4, running down the centre of the hall floor. Beneath these

gratings is a trench 5 or 6 feet wide by about 4 feet deep, containing steam pipes for heating. There is no proper cellar under the Work House, except the scullery and the extreme ends of the halls. The female (northern) hall "C" extends quite to the roof, its height being 45 feet, and is ventilated by skylights and a row of windows on either side of the clear-story. On the male side the clear-story is occupied by work shops, thus reducing the height to 32 feet—the ventilation being by skylights alone. On either side of these halls are three tiers of cells. On the female side there are 25 cells in a tier (150 in all). Each cell is 16 feet long, 8 feet wide, 11 feet high, having a latticed window about five feet high by two and a half wide, furnished with two movable glazed sashes. The upper half of the doors of the cells is also latticed, thus admitting air from the large hall. These cells are intended to accommodate four persons each. On the male side the cells on the ground floor are of similar construction to those above described, but on the second floor they are large enough to contain sixteen persons, and upon the third floor twenty-four; the number of windows is proportionate to the size, but there is but one door.

Across the extremities of the halls are placed, in the manner of transepts, wings, 132 feet by 26 feet. These contain no cells, but are occupied for offices, dining-

rooms, officers' lodgings, laundry and workshops, which last, in the third and fourth stories, were converted, during the prevalence of the cholera, into wards.

This description of the building will suffice. As regards the habits and occupation of the inmates, and the differences between the males and females, the following are most noteworthy as bearing upon the development of cholera.

The males, during the day, were at work out of doors, returning to the house only to take their meals and to sleep. The privies for their use were near their work, or at the river side.

The females, on the contrary, remained constantly within doors, working in the hoop-skirt shop, washing, scrubbing, or, the larger part, sitting, without work, in the "sewing-room." The water closets for their use—two in number—were empty cells at either end of the "sixth tier" in the third story. These cells were furnished with a properly-constructed seat, beneath which were placed tubs of the size of half a barrel. After the women were locked in their cells for the night, these tubs were taken to the river side, emptied, filled with water, and left till the next evening, other tubs taking their places during the next day.

Most of the time during the day these closets were thronged with women, part of whom came of necessity, but more to arrange their toilet; and especially as making it an excuse to escape from their work and the surveillance of the overseers, and thus hold a *conversazione* with their fellow-inmates. By this over-crowding and the accumulation of excreta, the air became quite foul, so that if any infectious dejections were contained in the tubs, these persons, frequenting the cell would be very liable to their influence.

At about six P.M., the inmates, both male and female, were locked up for the night; and to each cell were furnished kids holding water, and one or more buckets, to be used as close stools. When the cells were unlocked, at half-past five in the morning, these buckets were emptied by the inmates themselves, at the river side, and left there till the afternoon—half-past four in the summer, three o'clock in the winter.

The halls and cells were always kept scrupulously clean. The floors were scrubbed each morning and *then carefully dried*, and about once a week chloride of lime was used in the scrubbing for the more perfect purification. The walls, also, were whitewashed frequently—as often, indeed, as any parts appeared to be soiled, a fresh coat was immediately applied.

Lunatic Asylum.—By referring to the return, Appendix A, it will be seen that the ninety-eight cases of cholera reported, were distributed as follows :

Retreat.....	32 or 32.65 per cent.	
Pavilion "A".....	17	
" "B".....	7	
	—24 or 24.49	"
Lodge, Male.....	6	
" Female.....	8	
	—14 or 14.28	"
Main Building.....	28 or 28.58	"

During the height of the epidemic the "Retreat" and Pavilion "A" had a still greater per centage of the cases—more than sixty per cent. of those reported up to September 1st,—while these buildings contained only about thirty per cent. of all the inmates, the Pavilions containing about seven per cent. each.

While the Retreat had a population only a little more than that of the Lodge, and about one-third of that of the main building, it had more than twice as many cases as the former and a few more than the latter building.

Now, in seeking for causes of this difference, it appears : 1st. That the diet of all the buildings is identical. 2d. That the physical status of the inmates of each building is about the same, except that those in the Pavilions are mostly old, incurable cases, and, probably,

are in a somewhat worse condition than the others. The inmates of the Lodge are maniacs, the first floor being allotted to males, the second and third to females; but their condition appears to be nearly as good as that of the other inmates. 3*d*. As regards the situation and elevation (see map), the Lodge and main building stand higher than the Retreat and Pavilions. The latter, indeed, are upon reclaimed salt-marsh at the upper end of the Island. 4*th*. The construction of the buildings, the ventilation and privies, were as follows:—

The Pavilions are frame buildings, containing a single ward, 180 feet long by 24 feet wide. They are raised upon a foundation about 18 inches high. Their ventilation is sufficiently good by means of windows and ventilators in the roof. These wards contained about 65 persons each, giving ample air-space for each person. To each ward is attached a small wing containing bathroom, water-closet, &c. The privies in these pavilions are of the same pattern as those in all the buildings of the Asylum, viz.: a trough, covered by a seat, containing water, which, whenever necessary, is allowed to escape by removing a plug; the contents passing into a sewer which connects with the river, a few yards distant from the Pavilion. The nurse states that, during the cholera, these were frequently emptied.

The conditions of Pavilions "A" and "B" were, as far as discovered, identical. The difference in the number of cases in the two is undoubtedly due to the fact that, about the 1st of August, Pavilion "B" was converted into a cholera hospital, the majority of the inmates being removed to Pavilion "A," while the remainder were distributed to the other buildings of the Asylum. How far this assisted, if at all, in the distribution of the cholera, is unknown.

The other buildings are all arranged on the plan of separate rooms, except the upper floor of the "Retreat." The main building has an octagonal centre-building, used as offices, officers' quarters, &c., from the north-western and southwestern sides of which wings extend—the northwestern occupied by males and the southwestern by females. Each wing has three halls, 245 feet long, composed of a row of small rooms on each side of a central passage. These rooms are well-lighted and passably ventilated by windows. The allowance of air-space is not far from 700 cubic feet per person.

The Lodge has three stories, each having in the centre a narrow hall, and at each side a wider hall, which is connected with enclosed piazzas. The small rooms are, therefore, tolerably well ventilated, having a small window

over the door opening on the lateral hall with a smaller window on the central hall. The water-closets are at the eastern end of the building, one for each hall.

The Retreat has a centre core consisting of two rows of small rooms, placed back to back, and opening by a door and window upon the lateral halls, at the opposite sides of which halls the windows, through the walls of the building, open to the outer air. This is the arrangement of the first and second stories; the third story, however, is one large ward, from side to side of the building, ventilated, of course, by the windows. The water-closets are at the eastern end of the building, one for each hall.

These closets were found to be foul, and lacking a sufficient supply of water when inspected by Dr. Hamilton during the epidemic, August 4th and 5th. He also discovered that the cellar of this building was badly ventilated.

Now, although in the last three described buildings, the plan of separate rooms obtains, yet of the influence of this arrangement upon the spread of cholera, nothing can be predicated, since in all the buildings of the Asylum the inmates were allowed access to the halls and open air constantly during the day. Even in the Lodge they occupied the halls and enclosed piazzas. They were, there-

fore, really confined less than half the time. In the Retreat building where, on different floors, the two plans were tried side by side, little difference is shown :—

The first floor, small rooms, had.....	10 cases.
The second floor “ “ “	12 “
The third floor “ “ “	10 “

The population being, on the two lower floors, about 45 each, the upper floor about 60.

Alms House.—The cases reported to the Alms House were distributed as follows :

Males.	Alms House, 1st floor.....	7	
	“ “ 2d “	3	
	“ “ 3d “	5	
	“ “ Centre Building.....	3	
	—	18	
	Outlying wards.....	7	
	Location not stated	4	
	—	29	
Females.	Alms House, 1st floor.....	21	
	“ “ 2d “	19	
	“ “ 3d “	6	
	“ “ Centre Building....	8	
	—	54	
	Pavilion.....	27	
	—	81	
	—	—	
	Total.....	110	

It will at once be noticed that three-fourths of the whole number of cases were females, which is not propor-

tional to the relative number of inmates. On the day of the appearance of the cholera here, July 30th, there were in the Alms House 587 adult males and 636 females. It is fair to deduct, for the present, in this comparison the cases occurring in the female pavilion, 27 in all, and the population of the same, 99 persons. We have then 54 cases in 537 females, or about one in ten. Of the males about 480 were lodged in the main building. The number of cases developed among this number was 25, or about one in nineteen.

Now it will be seen that for so marked a difference, some tangible cause should be found. Inquiry shows :—

1st.—The diet (appendix “H”), whatever may have been its effect on the digestive system, was uniform throughout the institution.

2d.—That the physical condition of the males and females was not materially different, the majority of both being either aged or disabled.

3d.—That the buildings are identical in structure, namely: A centre building, four stories high, from either side of which extend wings, three stories high. Each floor of the wing contains four wards, making twenty-four in all, besides which there are in the centre buildings,

four or five wards used as dormitories. The wards in the wings run transversely, opening, at either end, upon piazzas. The ventilation is by a door and two windows, 7 feet 5 inches by 3 feet 3 inches, at either end of the ward. The wards at the end of the building have three additional windows each, but this appears to have had no influence on the number of cases.

The size of each ward is 56 feet long by 22 feet wide and 13 feet high, = 16,016 cubic feet. The average number of beds in each is twenty-four, giving an air space of 667 cubic feet per person, when the wards have their proper allowance, which was the case during the summer.

This allowance of air-space is, in many of the wards, diminished by the presence of infants distributed to them. In the wards occupied by the nursing women, their number is a little greater than that of the adults; the wards on the second floor have from four to six infants each. The two wards at the end of the eastern wing, Nos. 40 and 41, were set apart for infants alone, with only four or five adults each, as nurses.

4th.—That the habits of the inmates of the two buildings are quite different.

The males occupy their wards only during the night.

During the day such as could work are employed, and the remainder are kept out of doors, or, if the weather was inclement, in a shelter shed, erected for that purpose. They are practically in the open air all their waking hours, except meal-times.

The females, on the contrary, are for the most part very little out of the house. Some are working as scrubbers and washer-women, and others sit in the chapel room sewing; but the greater part still constantly sit in their wards, many going out hardly an hour a day.

By again referring to the table on page 135, it will be noticed that the three floors had, respectively, 21, 19 and 6 cases. The number of inmates on each floor is not far from the same. But there are some differences of habits deserving notice. The occupants of the first floor wards are chiefly very old or helpless persons, who are placed there to save them from the labor of going up and down stairs. Those on the floor above are not materially different, except that they are on the average somewhat younger, or less helpless; among these women are distributed children from four to eighteen months old to be brought up.

The third floor of the east wing (except ward 41) is occupied as hospitals for adults, and in these three wards

no cases occurred. The other wing contains the women nursing their own children. Of these four wards, one had three cases, another had one, and the other two had none.

In the centre building, the three wards (one on the first floor and two on the third), occupied by old women, had but one case. The two wards on the fourth floor, Nos. 49 and 50, had, respectively, one and six cases. Both wards are occupied by nursing women. No. 50 is set apart for those who are, or whose infants are, sick or suffering from skin diseases, which it is desirable to isolate. These women are allowed to remain in their wards more than the other nursing women.

The wards in all the buildings were at all times kept clean by daily sweeping and scrubbing.

The water closets here are by the river-side, at a short distance from the main buildings. [That for males is numbered 10 upon the map, that for females 22.] Their vaults connect with the river by sewers, in which the tide rises and falls, that for the male building always containing some water, that for the females being, I think, dry at low tide.

These are the main points as regards the Alms Houses, but it remains to mention the state of the two Pavilions. An account of these will be the more interesting, as one

entirely escaped, while the adjoining one suffered very severely. The cause of this difference has not been made apparent by the inquiries and examinations I have made; yet the facts may be of considerable importance by way of negative proof.

The situation of these two Pavilions is shown on the map (Nos. 8 and 9). They have the same length, 162 feet (inside measurement), and same width, 24 feet. The mean height of the northern (male) building is about 9 feet 6 inches, that of the southern (female) about 12 feet, making the air space of the former about 36,936 cubic feet, that of the latter about 46,656 cubic feet. The allowance per person was nearly the same, say 460 feet for males, and 470 for females; those numbering about 80; these, at the beginning of the cholera, 99.

Each Pavilion has, on either side, a narrow yard, extending the length of the building—162 feet. Those for the males have a width of $21\frac{1}{2}$ feet (on north side), and $20\frac{1}{2}$ feet (on south side); those for females 12 feet (north) and 30 feet (south): making the total width of yards the same for each Pavilion—42 feet, and separating the two Pavilions $32\frac{1}{2}$ feet. The grounds of the two are separated by a wall about 12 feet high. Upon these yards, as well as at front and rear, open the windows—26 in number—

of each building. Each of these windows are 5 feet 5 inches, by 3 feet 4 inches. In the roof are three ventilators (2 feet by 3 feet), and two dormer windows.

Against the sides of the dividing wall are placed the water-closets of the Pavilions—two for each—one of these being simply a urinal, and the other a privy arranged with tubs like those described at the Work House. These latter were emptied once a day. No material difference can be found between the two.

The two buildings have similar exposure to the sun. In the southern yard of each is a scaffolding for shade, and here the patients spent a considerable part of the day. It will be noticed that while the closets for the male Pavilion are in the same yard with this scaffolding, those for the female are not. So that the female patients were not necessarily so near them during the day. But the privy of the female Alms House is nearer (see map) to the female Pavilion than to the other; yet the distance is considerable, say 100 yards.

The condition of the inmates was as follows: The females for the most part were either suffering from nervous disorders, as paralysis or epilepsy, or were harmless lunatics. With these were a few incurables; only two or three, however, were bed-ridden. The other Pavilion was

used as a hospital; the diseases being chiefly paralysis, chronic rheumatism and phthisis pulmonalis. In addition, there were very many old men, transferred from other wards owing to their helplessness, or extremely filthy habits, which were such as to require constant cleansing of the ward by the orderly and helpers, to prevent its becoming foul. Both Pavilions were, however, kept quite clean.

There does not seem to be any important difference in the hygienic conditions of the two Pavilions. Considering the habits of the patients, the males would seem the more likely to suffer; but on the contrary, twenty-seven cases occurred among the females, none among the males, with the exception of one, which, though included in the return (No. 87, Appendix C) as cholera, is mentioned by the attending physician as doubtful. The patient was eighty years old, and recovered.

Penitentiary.—Since from this institution but nineteen cases with seven deaths are reported, while during the prevalence of the cholera there were confined in the building 405 males and 133 females, 538 in all, (Report for week ending August 4th) the question of accessory causes becomes rather a negative one, *i. e.* Why did this building escape thus lightly?

Running over the same inquiries as pursued at other institutions, it appears that, 1st. the diet (Appendix H) is not materially different from that of the other institutions. 2d. The amount of air-space (172 @ 197 cubic feet) allowed to each person is less than in any other building upon the island, the cells being seven feet long, three and a half wide, and seven high, except in the new wing, where they are about four feet wide. These cells are ventilated by the gratings of the doors, which open upon a corridor fifteen feet wide, which intervenes between the cells and the outer walls. There is also a vent pipe in the ceiling of each cell. 3d. The habits of the prisoners are much the same as at the Work House—the males working out of doors, and the females in the house. 4th. The system of privies is also much the same, the men using those near their work by day, while the women use one at the extreme southern end of the building, the vault having a sewer leading to the river. At night pails were used, as at the Work House.

The Hospital ward had cess-tubs, which were emptied daily, or oftener if necessary.

Charity Hospital.—The hygienic circumstances were here, in general, very good. The physical condition of the patients was, of course, very poor. The diet, being that of a Hospital, was considerably better than that of

other institutions; but is not introduced in Appendix H, as it varied for different individuals.

The allowance of air-space was generally ample; the ventilation and condition of closets (which have been in other institutions mentioned as being, perhaps, causative) seem to be here very good.

To this statement an exception should be made, which is:—That four cases of cholera occurred in one corner Female Ward 9: a flue which opened at this corner was found to lead to a cellar which was foul from refuse bandages, etc., collected there, as well as from containing a privy for the workmen about the house. The condition was such that Dr. Hamilton deemed it necessary to remove the patients from the ward till it and the cellar could be properly cleansed. This will be again alluded to farther on. This is the only instance discovered where any filth seemed connected with the epidemic in the Hospital.

But the manner of its appearance here deserves a word as giving the only instance where any facts, bearing upon the question of *importation*, have been discovered, although the communication had been constant among all the institutions throughout the epidemic. In particular, persons committed to the Work House, are daily sent to the

Asylum, Charity and Bellevue Hospitals, and occasionally to the Almshouse, as helpers, besides the transfer of patients to Hospitals and nursing women to the Almshouses.

The first cases then, excepting the three sporadic ones, mentioned above, were Ann Swift and Eliza Cowan. Both were transferred from the Work House, where the former had assisted in the cholera wards, and the latter had actually been attacked.

The night after Ann Swift's arrival, July 31, she was seized with cholera, which did not, however, prove fatal.

Cowan was transferred on the 3d of August as convalescent, but the symptoms had not entirely disappeared, and she died on the fifth.

In the interval other cases were developed; the next case being in the ward adjoining that in which Swift had been sick.

Very soon after the disease appeared in distant and various parts of the house.

Personal causes.

These, again, may be divided into those exercising quite a general influence, and those more limited or quite individual in their action.

Generally, then, the inmates of the Island were, to a great degree, debilitated or cachectic, either from disease or confinement, as at the Asylum and Hospital; from debauched life or habitual drunkenness, as at the Work House; from these causes, or from age and privation, as at the Alms House.

We ought to notice the effect of these same causes upon the susceptibility of individuals.

Of the influence of particular *debilitating diseases* I have been unable to obtain sufficient data to enable me to speak with any degree of accuracy or positiveness. Of the cases at Charity Hospital, the diseases at admission is recorded in the thirty-five only, viz :—

Various Venereal Diseases.....	10
Cholera Epidemica.....	3
Other Intestinal Disorders.....	5
Thoracic Affections.....	3
Rheumatism.....	3
Ulcer.....	3
Miscellaneous Diseases, (one case each).....	8
	—
	35

In addition, although I have no statistics upon the point, I have the assurances of several members of the staff that they observed those affected with pulmonary tuberculosis, and Bright's disease (diseases in which a

deranged state of the intestinal canal is common) to be especially susceptible to the cholera poison.

It is generally thought that a *dissolute* or *debauched* life markedly heightens this susceptibility. The prevalence of such habits among the inmates of the Island is so nearly universal that the epidemic under discussion proves nothing upon this point, unless we accept as an argument the fact that it was severest at the Work House, where this class of persons is most common—vagrancy, prostitution and drunkenness being the chief grounds of commitment.

But of the effect of a *recent debauch* I can speak more decidedly. Quite a number of cases were noted, both by others and by myself, where choleraic symptoms rapidly supervened upon a debauch, or the free use of alcohol under the impression that it exercised a prophylactic influence. Several of these were less than ordinarily exposed to recognized sources of infection.

At the Work House, of those constantly employed about the sick as nurses and "Doctor's runners,"—especially if we except those who became nurses after convalescence from an attack—I think a larger proportion escaped than of those not so exposed. But with the majority of those nurses who were seized, a debauch

had immediately preceded the attack. One nurse—who was very faithful in the performance of her duties—experienced choleraic symptoms on three distinct occasions, after having each time too freely taken whiskey to support her strength.

A similar instance was noticed at the Alms House. Two nurses—who had escaped while attending the sick—became intoxicated; the one some ten days after the cessation of the epidemic, the other a week later; and in both cases a fatal attack of cholera immediately followed.

There seems to be little or no proof of *contagion*, in the ordinary sense of the word. We have just spoken of the comparative exemption of nurses at the Work House, and of the circumstances in the cases of those at the Alms House. At the Asylum, but one helper died; and it is stated in the report from that institution, that the attack in this case was provoked by great carelessness on the part of the patient. The other facts bearing upon this point, seem all to be capable of other interpretation.

The following table will show the relation of *length of residence* to susceptibility :

	Lunatic Asylum.	Work House.	Alms House.	Penitentiary.	Charity Hospital.	Total.
Residence less than ten days.....	..	76	1	2	11	90
“ from ten to thirty days.....	..	54	4	4	11	73
“ from one to three months....	4	39	20	8	16	87
“ from three to six months*....	..	32	..	..	..	32
“ from three months to one year	24	..	14	5	11	54
“ from one year to five years...	36	..	33	..	..	69
“ above five years.....	34	..	9	..	..	43
“ not stated.....	..	3	30	..	1	34
Total.....	98	204	111	19	50	482

*At Work House six months is generally the limit to confinement.

To make this table really valuable, it is necessary to know precisely how many of each class (as above divided) were in each institution during the prevalence of the cholera, averaging from daily estimates. This I have not obtained.

The only place where the effect of *recent arrival* can be calculated is at the Work House, as here the greatest number of transient inmates is found. It will be noticed,

that of the two hundred and four cases (Appendix "B") seventy-six (rather more than one-third) had been, when seized, less than ten days resident. Now, it appears from the books that commitments for ten days constitute about one-half of the total number, and this might seem to account for the large proportion seized thus early; but, in reality, the number of ten-day commitments does not fairly represent the relative number of these persons resident in the house, since those committed for the shortest periods (and whose escape is therefore of least consequence) are generally selected to be sent as workers to other institutions. Indeed, I find that though seventy-six were attacked within ten days, and fifty-four between ten and thirty days, after arrival, (one hundred and thirty in all), yet of all the cases (two hundred and four), sixteen males and twenty females (thirty-six total) were committed for ten days, and seven males and one female (eight total) for one month (forty-four in all;) little more than a third of the one hundred and thirty cases. This would seem to accord with the received opinion, that newly arrived persons are especially susceptible, while others experience a kind of acclimatization. An additional argument is the following: by inspecting the table ("Appendix B") I find that the proportion of newly arrived persons seized, increased as the epidemic proceeded. Thus:—

	Resident ten days or less.	Resident between ten & thirty days.
Of the first thirty cases there were.....	9	5
Of the second thirty cases there were.....	9	7
Of the third thirty cases there were.....	7	11
Of the fourth thirty cases there were.....	13	5
Of the fifth thirty cases there were.....	6	9
Of the sixth thirty cases there were.....	18	8
Remaining twenty-four cases	14	9
Total.....	76	54

Appendix "K" gives the classification of cases by *sex* and *ages* in decennial periods. The column of totals shows the following :

	MALES.			FEMALES.			TOTALS.		
	Cases.	Deaths.	Per cent.	Cases.	Deaths.	Per cent.	Cases.	Deaths.	Per cent.
Under 20 years.....	9	5	55.5	20	11	55.0	29	16	55.1
Between 20 and 30 years	36	22	61.4	100	73	73.0	136	95	69.8
" 30 " 40 "	29	24	82.7	75	56	74.66	104	80	76.9
" 40 " 50 "	29	21	72.4	56	42	75.0	85	63	74.1
" 50 " 60 "	26	18	69.2	40	36	90.0	66	54	81.8
" 60 " 70 "	20	18	90.0	20	18	90.0	40	36	90.0
" 70 " 80 "	3	3	100.0	10	10	100.0	13	13	100.0
80 and upwards.....	1	..	....	2	2	100.0	3	2	66.6
Unknown	4	..	....	2	1	50.0	6	1	16.6
Total.....	157	111	70.70	325	249	76.61	482	360	74.68

That is, the death-rate increased with the age of the patient as in many other diseases, and was somewhat higher with females than males.

Now, the value of this table, as showing the effect of age upon susceptibility, is destroyed by the absence of data as to the proportion of the whole number of inmates in each of these classes. I have been able to obtain no such statistics, except the following, which is a classification of the patients admitted into the Asylum during the past year :—

	Males.	Females.
Under 20 years.....	7	13
Between 20 and 30 years.....	54	106
“ 30 “ 40 “	70	107
“ 40 “ 50 “	66	54
“ 50 “ 60 “	25	29
“ 60 “ 80 “	9	17
	<hr/> 231	<hr/> 326

I am informed that the proportion of each of these classes to the total would be about the same, if the whole number in the institution were estimated.

Perhaps the annual reports from the various Institutions, now about being presented to the Commission, may give the lacking data.

The large proportion of females (about two-thirds) among the cases suggests the idea that *sex* may consid-

erably influence susceptibility. But the difference,—when any exists, after considering the greater number of females than males in most of the Institutions,—as well, probably, as the higher death-rate just alluded to, may, in many instances, be explained on the ground of special exposure. For example: Of the 98 cases at the Asylum 25 were males and 73 females. Of these 73, 56 occurred in the Retreat and Pavilion, where females alone were lodged, leaving but 17 women attacked in the main building and Lodge, from which buildings the 25 male cases came. Under the same circumstances, then, the percentage is in favor of the females.

At the Work House the number of cases was 72 males and 132 females, the proportion being very nearly the same as that of the average number of inmates of both sexes. At the outbreak of the cholera there were in the building 214 males and 435 females; but later, by discharges, the preponderance of females was diminished.

At the Alms House the number was 26 males and 85 females. If we subtract the 27 cases occurring in the Pavilion, still we have 58 cases among the females—more than twice as many among the males. The difference between the hygienic conditions of the two, as has already been described at length, will, I think, go far to account for the disparity of numbers.

At the Penitentiary there were attacked about 4 per cent. of the males and about $2\frac{1}{4}$ per cent. of the females, showing here an advantage on the side of the latter.

At the Charity Hospital the numbers are 18 males and 32 females. Probably the per centage is a little heavier among the females, though the precise number of either sex in the building I have not ascertained; the females, however, were considerably more numerous, there being then 11 wards occupied by males and 16 by females.

We may include under the head of personal causes, the question, as to how far the *washing of infected clothing*, which has been quite strongly urged as a cause, did really act as such. Now, the facts are as follows:—

At the Asylum were employed about 20 washer-women; of these one had cholera. This is only 5 per cent., or a considerably smaller per centage than among those not so employed.

At the Work House 12 washer-women died, their places being supplied by others; the total number being 34. This proportion (35 per cent.) is somewhat heavier than among those who did not wash.

At the Alms House the precise number of washer-women attacked is not stated; but the washing is chiefly

done by the nursing women from the wards 45, 46, 47 and 48, which have been already mentioned as having but four cases in all, which is certainly below the average.

At the Penitentiary, I neglected to inquire upon the point.

At Charity Hospital no washer-woman was seized.

The amount of danger from infected articles would, in all probability, be very slight where disinfectants were freely used; but for the first few days of the epidemic this matter was, in the main, overlooked, and full play was then allowed for the action of any infectious material.

The particular manner of disinfecting and cleansing soiled articles at each institution will be mentioned under the next general head.

Fourth.—What means were employed for its arrest, and with what success?

These may be, for convenience, divided into those of a *general hygienic nature*, and those with *special reference to infectious matter*, although the distinction can not be closely drawn.

Under the first head come *Changes in Diet, Prophylactic Medicines, Improved Ventilation.*

The regular diet of the several Institutions is given in Appendix "H." The following changes were made :

At the Lunatic Asylum a certain quantity of mutton was substituted for the salt beef used as soup stock, which latter was found to cause intestinal disorders. In addition, rice was ordered in place of mush and molasses. The date of these changes is not stated.

At the Work House, August 4th, Dr. Hamilton directed the following changes : That at breakfast *coffee* should be substituted for *rye-coffee* ; that the dinner should be of meat, bread and *potatoes* (soup being, I think, discontinued), and that at supper rice and tea should take the place of mush and molasses. Dr. Hamilton's notes state that on the next day (5th) this had all been completed, with the exception of the tea, which had not yet been obtained.

At the Alms House nearly the same substitutions were directed and complied with.

At the Penitentiary the only dietary change I know of was the introduction of the mush and molasses ; but the value of this is shown by the fact, which Dr. O'Dwyer reports, that after the resumption of the mush diet for supper, a few weeks later, the amount of diarrhoea very considerably increased.

A large proportion of cases being developed during the night, the following mixture was issued, Saturday, August 4th, at the Workhouse, as a "night-cap" to each person :

R. Whiskey, f $\frac{3}{4}$ i;
 Tr. Capsici, mxv. ;
 Aquae, f $\frac{3}{4}$ iii ;
 M.

For those who had diarrhoea, to this mixture was added Tr. Opii, mxv.

At the Alms House the same prescription was used, with the substitution of an equivalent quantity of Pulv. Zingiberis ; and at the Penitentiary with the substitution of black pepper.

In addition, in some instances, where it was thought that chilliness may have contributed to the development of choleraic symptoms, extra blankets were issued.

In regard to *ventilation*, the following appears from Dr. Hamilton's notes:—

August 4, the cellar of the Retreat was ordered to be ventilated, as it was foul.

At the Work House on the same day it was ordered that stoves be put in the cholera wards, and fires be kept in them to assist in creating a current of air ; the windows

to be kept open at the same time. This being Saturday, probably the order could not be executed before Monday, the 6th. Indeed from Dr. H.'s notes it appears that the requisition for the stoves was not made till this latter date.

At the Alms House the same instruction as to kindling fires in female wards was given.

At the Penitentiary I find no special changes in the ventilation except the removing of obstructions, such as rags, from the vent-holes and doors, which the prisoners had put in with a view to hindering the visits of rats.

At Charity Hospital no special need appeared for change in the ventilation of the building, which, as has been previously stated, is very excellent.

In regard to Female Ward 9, mentioned above, it appears from a report bearing the date of August 29th, made by Dr. Macomb to Dr. Hamilton, that there had occurred in this ward four cases of cholera, three fatal; five cases of cholera morbus, and nearly a dozen cases of acute diarrhoea, all recovering. From the cellar before alluded to, "four wheel-barrow loads of filth" were removed. The patients were removed from the ward Aug., 27th, and this is the close of the epidemic at Charity Hospital.

Under the second class come, *Isolation of cholera patients ; The removal of inmates from infected localities ; The removal and disinfection of dejections, or articles soiled by them ; The arrest and immediate treatment of diarrhoea cases.*

At the Asylum isolation was established from the first. The earlier cases were removed to the Gymnasium (No. 21 on map), not far from the main building. Later, about the 1st of August, Pavilion "B" was converted into a cholera hospital and all cases were sent there till the latter part of September.

At the Work House the cases were not taken from the building at any time, but to large wards in the transepts. At first to Ward "H," situated on the third floor of the north-eastern transept, which is always the sick-bay, but the second day another ward (Room "G" on the same floor, but across the hall) was opened ; and August 1st, another ward for the females (over Ward "H") and others for males (in the southwestern transept).

At the Alms House on July 31st, the day after the appearance of the cholera there, a tent (marked "20" on the map) was erected near the Female Alms House. To this the patients, four or five in number, remaining in the Pavilion, were immediately removed ; and to it and to

another adjoining it, erected a few days later, were taken all female cases as they occurred.

For the males, except that a few were taken to a vacant room in the Male Alms House, no provision was made till August 4th, when the waiting-room near the dock (No. 6 on the map) was opened as a ward.

The earlier cases from the Penitentiary were taken to tents near the Small-pox Hospital (No. 18 on map); but a convalescent, with his nurses, having eloped, the later cases were treated in the Penitentiary building.

At Charity Hospital, after the epidemic became well declared, most of the cases were removed before death to the tents near the Small-pox Hospital; but later (August 13th), owing to the great mortality among the patients thus removed, the Ampitheatre was used as a female ward, and Ward No. 1 for the males.

This isolation of cases was carried into effect only after the cases had become well marked, and often not till death was close at hand, so that really quite a portion of the career of the disease was passed among other inmates, and the good effect of the isolation was therefore lost.

Removal of patients from infected localities.—At the Asylum I can find that nothing of this kind was done

beyond the freedom of the yard always allowed to the inmates.

At the Work House on the 3d of August the following changes were made as regards the female inmates. They were allowed to be out of doors from 4 A. M., till 8 P. M., and at night their cell doors were not locked, and outer doors remained open, so that they could at will leave their cells and the building, to use the cess-tubs place outside.

Such was the construction of the Work House, and so great the number of inmates, that no part could be really entirely vacated, and this plan was the nearest practicable alternative. This, combined with the removal of the privies, presently to be spoken of, appears to have been the most effectual of all the means used to break the power of the epidemic.

During three or four days succeeding the 30th of July, about one hundred women, together with some men, were discharged, with a view of thus limiting the epidemic.

At the Alms House the plan of keeping the inmates out of doors was also adopted; but here more difficulty was experienced in inducing the women to take this

precaution, the exercise of the authority of the officers becoming necessary to compel its observance. During the epidemic many took their discharge.

Absolute permanent evacuation of any ward was impossible here also, owing to the great number of inmates.

At the Penitentiary the prisoners were allowed to remain in the open air on Sundays, instead of being locked up, as had previously been the custom. On other days, however, I believe the usual routine continued.

At Charity Hospital, patients whose condition rendered it proper were encouraged to leave the Hospital, for the double reason of securing themselves and giving additional room to those who must remain. During the first week or ten days of August, not far from two hundred persons thus took their discharges. Those who remained were kept as much as possible in the open air when the weather was suitable. Here, too, as previously twice mentioned, Ward 9 (female) was quite emptied, and the patients scattered among other wards.

Next follows *the removal and disinfection of dejections and articles soiled by them, including under this head the disuse of privies situated within the buildings.*

As this last obtained only at the Work House, we may speak of it first. On the 3rd of August Dr. Hamilton directed that the female inmates should, as did the males already, make use of privies by the river-side during the day, and that at night the pails should not be placed in the cells; but that the women should go out to cess-tubs, thus avoiding the constant exhalation of their own dejections.

At the Asylum "at the onset of the epidemic, a plentiful supply of water had been secured, and a thorough cleansing of closets and sewers was at once instituted and kept up. Also the water-closets and sewers were disinfected by abundant quantities of sulphate of iron, coal-tar, and chloride of lime. Disinfectants were freely used in all vessels, and in all places, where the dejections of patients sick of diarrhoea were placed or thrown."

At the Work House the only disinfectant at first, at hand, was the chloride of lime. This was used freely, being put into the night pails and cess-tubs in considerable quantity before they were used; it was also applied to the soiled articles. A disinfectant ("Counter-ets"), the active ingredient of which appeared to be carbolic acid, was also used to some extent.

On Saturday, the 4th of August, Dr. Hamilton ordered

in addition, the following disinfectants for the use of the several institutions: Quick-lime for privies and cellars, sulphate of iron for use upon excreta, dead oil of coal-tar for more perfect disinfection of privies, Labarraque's solution, carbolic acid.

At the Work House, the first two of these were chiefly used. They were very freely used in privies and pails, and upon bedding, garments and floors.

These two disinfectants, with chloride of lime, were, indeed, almost the only ones used at the Alms House, Penitentiary and Charity Hospital. The matter of disinfection was, as I learn from Dr. Ware, quite carefully attended to at the Alms House.

Early in the epidemic, as nearly as can be ascertained, on the 2d of August, Mr. Owens, the Warden, ordered the beds to be removed from the Pavilion, where the epidemic was most severe; the building to be cleansed, whitewashed and ventilated. For want of other accommodation, however, it was necessary to occupy it again at night.

At the Penitentiary disinfection appears to have been discontinued speedily (probably the number of the cases not being sufficiently great to cause much alarm), since

Dr. Hamilton (August 19th) directed the resumption of the disinfection and of the whiskey ration, which had been also discontinued.

At Charity Hospital, disinfection of water-closets and dejections was quite closely overseen, in addition to the directions of each of the resident staff, by Dr. O'Dwyer, the senior member, who had this special duty assigned to him.

A very important part of disinfection remains to be spoken of, namely, the *washing of infected articles*. The order issued by Dr. Hamilton was, that clothing should be boiled at the earliest practicable moment; and if this was delayed, they should, in the meantime, be thoroughly impregnated with some disinfecting fluid. The execution of these orders was necessarily intrusted to persons unacquainted with the real object of the process, namely, the destruction of the poison, and who were generally content if the articles *looked* clean. It is, therefore, somewhat difficult to ascertain how thorough was the disinfection by washing.

At the Asylum, two tubs were set apart exclusively for washing, and one for scalding (boiling) the cholera clothing. They were first soaked in cold water, then scalded with boiling water, and afterwards washed.

Clothes soiled late in the day remained till next morning ; and those soiled on Saturday night till Monday morning. I am, however, informed that a sufficient quantity of sulphate of iron was put upon them to keep in check the development of the poison.

At the Work House, for several days the clothing was washed as usual, namely, by soaking over night in cold water, and then washing in hot water. Later, however, when the overseer of the Wash Room came to understand the necessity of so doing, they were immediately boiled.

At the Alms House, the same mistake obtained at first, but afterward the clothing was taken to a shed in the rear of the dwelling marked 13 on the map, where the boiling was attended to by two imbeciles.

At the Penitentiary, I neglected to inquire upon this point.

The overseer of the Wash House at Charity Hospital states that she washed the cholera garments and bedding in the same manner as other things, by soaking and then washing, her only precaution being that of using separate tubs for these articles. It should be remarked, however, that at both the Hospital and the Asylum, the washing is mainly done by an engine, so that the washer-

women would be less exposed to any infection than if, as at the Work House and Alms House most of the cleansing were done by hand.

The Arrest and Immediate Treatment of Diarrhœal Cases.—On the Island, as probably everywhere that cholera ever prevailed, great difficulty was experienced in bringing patients under treatment until the disease was so far advanced as to render it futile. Testimony is also borne as to the ease with which the disease is checked when it can be treated during the stage of diarrhœa.

At the Asylum, while seventy-three and a half per cent. of the cholera cases proved fatal, only three out of one hundred and fourteen cases of diarrhœa died. Cases of diarrhœa not yielding to a single dose of medicine were isolated.

At the Work House, the difficulty was overcome in this wise: When the inmates were turned out of doors and forbidden the use of privies in the house, they, of necessity, went to those by the river. A guard stationed here noted all who came, and the number of times; and if any one came often enough to excite suspicion of diarrhœa, she was immediately reported and obliged to enter the diarrhœa ward (which was opened August 4), and there be placed under treatment. It is stated that,

of the large number admitted to this ward, not one died. Previous to this arrangement attempts had been made to arrest the disease by furnishing diarrhoea medicines, placed in several parts of the house, to all who should need them; but they either would not apply at all, or, having been somewhat relieved by one dose, would deem it unnecessary to return for another; or else, not being relieved at once, would give it up altogether as useless. The same was the case at the Alms House, where the plan of arrest was not, to my knowledge, enforced.

At the Penitentiary, Dr. O'Dwyer informs me that a "runner" made rounds all night with diarrhoea medicines, giving, to those needing them, a dose every hour.

At the Hospital, of course, the patients could be kept nearly all the time under surveillance, but not entirely. On comparing the number of cases of cholera in each ward with the known ability or vigilance of the nurses in charge, a sufficient correspondence was found to make it worthy of note; though it would be very unfair to ignore the differences which exist as to the class of patients in different wards, as well as the different circumstances under which these wards were placed.

Now, these were the means employed, and *with what success?*

Appendix "I" gives the daily meteorological observa-

tions during the prevalence of the cholera (obtained by the kindness of Dr. Elisha Harris, Registrar of Vital Statistics, to whom I would here acknowledge my indebtedness for this and many similar favors), together with the number of cases and deaths on each day in each institution, and their total. This is also shown in the diagram.

Now, it would seem fair to judge of the value of sanitary measures by the diminution of the number of cases in the Institution where they were applied. If, then, we attempt to apply this rule by means of Appendix "I," and the dates above given of the adoption of certain measures, the inquiry becomes quite embarrassing. For we see at the Asylum, at the Alms House, as well as at the Charity Hospital, the wave rising to a limited height, then falling, and again rising, and so continuing a gentle undulation for some time; and yet, no corresponding vigilance or negligence, from time to time, in the enforcing of sanitary measures has been detected.

Again, at the Work House, where the wave rises suddenly to a great height, and falls as suddenly, what is seen?

That the epidemic, beginning with sixteen cases on the 27th of July, reached its climax of thirty-three cases on

the 2d day of August. The next day it declined to thirty cases. Now, it may be urged that the epidemic was retiring when measures were taken to put it to flight; since the first date of sanitary change is August 3d.

Now, this objection is not really valid, for this reason. On the 1st and 2d of August some measures had already been adopted, chiefly in regard to greater vigilance on the part of physicians and attendants in discovering patients in the early stages of the disease, and the use of the disinfectants then at hand. For up to August 1 I had been alone. Dr. Sykes took charge on the 1st, and Dr. Castle and myself remained as his assistants until the 3d, and six "Runners" took the place of two, previously employed. Nor was the epidemic really decreasing; for on the 2d of August there were in the Work House five hundred and seventy-nine inmates; from these thirty-three cases were developed on that day, or 5.52 per cent. On the next day, the 3d, the census showed five hundred and thirty-three inmates, with thirty cases, or 5.62 per cent. This day the women were turned out of doors, and the day following, out of five hundred and nineteen inmates, twenty-one cases, or 4.04 per cent. were developed, and on the 5th, the same measures continuing in force, and in addition, the changes in diet and disinfection having been instituted, the number fell to

twelve, or 2.31 per cent. ; the next day to four, or 0.7 per cent., and the epidemic was virtually at an end.

Fifth.—Therapeusis.

As regards therapeusis very little can be said. Its unsatisfactoriness is shown by the high rate of mortality. The remedies chiefly used were, during the premonitory diarrhoea and earlier stages :

Opiates, either alone, as the Tincture of Opium, or Sulphate of Morphia, given dry upon the tongue, or in combination, *e. g.*

Pil. Plumbi et Opii, or the following formulæ :

R. Plumbi acetatis, gr xii
Opii pulv., gr iii
M. in Ch. No. vi. div.

Or,

R. Tr. Opii,
Tr. Camphoræ, aa f $\frac{2}{3}$ i
Tr. Rhei, f $\frac{2}{3}$ ii
M.

Or,

R. Tr. Opii,
Tr. Camphoræ,
Tr. Capsici,
Spts. menth. pip.
Chloroformi, aa partes æquales.
M.

Or, the "Ruschenberger Mixture," or the "Squibb's Mixture."

In the active stage these were nearly all uniformly rejected; dry morphine being somewhat better retained than the others. The hypodermic method of administering morphine seemed to be more generally satisfactory than any other, as a mode of obtaining sleep, and especially as a local palliative in arresting the muscular cramps, even though the intestinal symptoms were unchecked. At the Work House many of those who recovered attributed their escape to this relief; and the fact that many died apparently from sheer exhaustion would seem to give probability to their opinion. At the Penitentiary, it constituted the principal treatment in the small number of cases which occurred there.

Anti-emetics, such as lime-water, creasote (or a mixture of the two), chloroform, etc., were used quite freely.

External Applications.—Sinapisms, hot bottles, friction, were used; but with no material advantage.

Water in most cases, was given quite sparingly owing to its immediate rejection. Ice, however, was given freely: also a moderate amount of stimulants, such as whiskey and egg-nogg.

As far as possible patients were kept quite at rest and in a recumbent posture, though the restlessness of

many* of them interfered with this to a considerable extent.

In the stage of collapse medication was generally slight. More reliance was placed in stimulants and alimentation when this could be retained. It is worthy of remark, that often when the anti-emetics above mentioned were rejected, bland forms of food, *e. g.*, milk, alone or boiled with corn-starch, beef-tea, or even oat-meal gruel, would be retained and speedily be followed by a cessation of symptoms. Some other plans of treatment were tried in a few cases at the Hospital, especially by Dr. Inches, but I cannot obtain the notes of the cases, the doctor being now in Europe. A few cases were treated, according to the advice of Dr. Rahim of Calcutta, by the subcutaneous use of a mixture of the bromide of potassium, Tr. quassiae and vegetable charcoal. *The result was nil.* The cases all dying as did those under other forms of treatment.

Some attempts were made at transfusion of an artificial serum, with the introduction of oxygen into the peritoneal cavity, but with only a temporary beneficial effect.

In the convalescent stage, the treatment was directed to the extreme weakness which generally obtained.

Though, for the most part, in the foregoing pages, I

have avoided stating conclusions or urging arguments—preferring to leave these to others, while I confined myself to stating facts—still a brief summary of the points of the report may not be improper, but of value.

They are these:—

1st.—The clinical history and post-mortem appearances of the cases establish the epidemic as clearly “Asiatic Cholera.”

2d.—That it pursued quite a uniform course from the northeastern to the southwestern extremity of the island, and the time occupied in its passage was sufficiently long to render the explanation of its spread by atmospheric dissemination unnecessary.

3d.—That no *proof* of its importation to the island has been found;—the first cases in all the institutions having been at least several weeks resident, though at the Work House quite a number of the persons seized on the first day of the *epidemic* had been in the house and on the Island less than ten days;—that the only probable case of importation from one institution to another is at Charity Hospital; that no evidence can be obtained which can render the supposition of the importation of cholera into Ward’s Island from the Work House, anything more than probable.

4th.—That cholera established itself upon the Island, and prevailed with greater or less severity in different Institutions, apparently unaffected by ordinary hygienic conditions, such as *diet*, for this is nearly identical at the Work House and Penitentiary, the two extremes of prevalence; as *cleanliness*, for all were scrupulously clean; as *allowance of air space*, as shown in the Penitentiary and Work House.

5th.—That of the effect of habitual drunkenness, of age, and of debilitating diseases, nothing can be predicated from the facts at our command.

6th.—That a recent debauch, or a recent arrival at the seat of the epidemic, increases susceptibility to the cholera poison.

7th.—That we have *no proof* of personal contagion, or of any influence of sex upon susceptibility.

8th.—That, in a word, the key of an epidemic in any building (or *mutatis mutandis*, its exemption), is *the introduction of an initial case*; and the severity of such an epidemic will depend mainly upon the amount of infected excreta retained in that building, and the amount of exposure of the inmates, by confinement, to the exhalations therefrom.

9th.—That we have proof of the value of sanitary measures, especially disinfection, in its various forms.

10th.—That the sanitary measures, which seem most crowned with success are the removal, as far as possible, from buildings found to be infected, of their inmates, and substances believed to be infectious, such as excreta ; and pre-eminently the arrest and treatment of all cases of diarrhœa.

11th.—That as regards therapeutics, nothing new has been discovered.

In closing this report, I refrain from offering any apologies for its shortcomings, since, I know that you appreciate, from your own experience, the difficulties of such an undertaking.

It remains, however, to acknowledge the many favors I have received while preparing it. I am indebted, not only to the gentlemen whose names appear upon the first page, but also the other members of the Charity Hospital staff, for facts furnished by them.

Above all, I desire to express the obligations I am under to DR. FREDERICK A. CASTLE, of the staff. His assistance has been most invaluable, and it is but justice to him to say, that a large part of the credit of this report is due to him.

Mr. Sumner, Recording Clerk at the Lunatic Asylum,

also Messrs. Brown, Parker and Sites, clerical assistants at the Work House and Charity Hospital, have rendered me valuable aid in gathering facts concerning the respective Institutions.

All of which is respectfully submitted,

LEROY MILTON YALE, M. D.,

81 East Thirty-ninth street, New York.

January 5, 1867.

APPENDIX "A."

RETURN OF CASES AT LUNATIC ASYLUM.

No.	Name.	Age.	Location.	Time.		Attacked.	Died.	Recovered (R)	Duration of Attack,	
				Yrs.	Mos.				Days.	Hrs.
1	Maria Tracy.....	53	Retreat 1 and Pavilion B	3	5	July	23 July	23	....	3
2	John Clark.....	59	Main B. H. 3	16	..	"	25	....	R	2
3	Frederick Dunbar..	44	"	3	14	6	"	26	R	1
4	Elizabeth Dean.....	41	Retreat	3	4	3	"	26	"	28
5	Ann McGinty.....	38	"	2	..	9	"	26	R	2
6	Julia Miller.....	30	Pavilion B	..	7	"	25	"	28	2
7	Mary Katin.....	37	Retreat	2	14	..	27	"	27	8
8	Barbara Messmer...	28	"	3	4	10	"	27	"	30
9	Jane Dawd.....	39	Pavilion A	9	..	"	29	....	R	2
10	Jane McNelvie.....	60	Retreat	3	1	10	"	29	R	1
11	Mary Donahue.....	55	"	2	5	5	"	30	"	31
12	Margaret Glennon...	31	"	2	6	9	"	31	August 4	3
13	Agnes Matthews....	40	"	3	4	10	"	31	....	R
14	Elizabeth Chaitillon.	46	"	3	8	3	August	1	"	1
15	Margaret Devine....	29	Main B. H. 3	4	6	"	1	....	R	18
16	Catharine Eidenberg	40	Retreat	1	1	9	"	1	"	2
17	Catharine Freund...	34	Pavilion A	5	6	"	"	1	"	6
18	Ellen Ward.....	27	"	A	..	9	"	1	"	4
19	Christina Waters...	20	"	B	..	7	"	1	"	6
20	Ellen Campbell.....	51	Retreat	3	5	5	"	2	"	5
21	Celia Dunleavy.....	25	"	3	2	9	"	2	"	9
22	Elizabeth Loughman	32	Pavilion A	..	9	"	2	"	5	3
23	Mary Russell.....	31	"	A	..	9	"	2	"	3
24	Patrick McGuire....	45	Retreat	..	6	"	2	"	3	1
25	Maria Barry.....	27	"	1	1	1	"	3	"	4
26	Emma Leiber.....	34	Pavilion A	..	7	"	3	....	R	2
27	Ellen Callahan.....	39	Lodge	8	9	"	3	"	6	2
28	James Wilson.....	58	Main B. H. 1	1	1	"	4	....	R	3
29	Emily Banham.....	60	"	2	17	10	"	5	"	6
30	Charlotte Da Cunha.	57	Lodge	..	2	"	5	....	R	1
31	Grace Douglass.....	29	Retreat	1	3	6	"	5	"	6
32	Maria Handley.....	29	Pavilion A	10	5	"	5	"	9	4
33	Pamela McGee.....	65	Retreat	1	9	5	"	5	"	5
34	Nancy McCormick...	46	"	2	15	2	"	5	"	8
35	Maria Reed.....	33	Pavilion A	..	9	"	5	"	6	1
36	Margaret Collins....	38	"	B	8	..	"	5	"	8
37	Hannah Clancy.....	60	Main B. H. 1	3	1	"	6	....	R	3
38	Mary Little.....	33	Lodge	1	..	"	6	....	R	2
39	Margaret Quinn.....	21	Retreat	1	..	3	"	6	"	6
40	Margaret Ryan.....	61	Pavilion A	2	9	"	6	"	9	3
41	Bridget Skelly.....	46	Retreat	1	6	..	"	6	"	11
42	Rose Baumgartner...	39	Pavilion A	1	4	"	7	"	9	2
43	Angeline King.....	40	"	B	1	..	"	7	"	R
44	Ellen Lacy.....	40	"	B	9	6	"	7	"	R
45	Ellen Smith.....	40	"	A	..	9	"	7	"	10
46	Ellen Fairly.....	46	"	A	14	3	"	8	....	R

RETURN OF CASES AT LUNATIC ASYLUM.—CONTINUED.

No.	Names.	Age.	Location.	Time.		Attacked.	Died.	Recovered	Duration of Attack.	
				Yrs.	Mos.				Days.	Hrs.
47	Margaret McTiernan	25	Pavilion	A	4	August 8	....	R	2	....
48	Caroline Tegeler	87	Retreat	2	9	August 9	....	R	1	12
49	Honora Hunt	74	"	2	17 da	9	....	R	1	....
50	James Collins	61	Lodge	ys	9	9	....	R	1	12
51	Samuel Eisgran	49	Main B. H.	3	9	10	....	R	3	....
52	Rose Giligan	36	Lodge	....	5	10	....	R	1	12
53	Ann Reynolds	27	Pavilion	A	....	10	....	R	2	6
54	James Mulligan	37	Main B. H.	1	10	11	....	R	....	12
55	Ellen Longfield	60	Pavilion	A	9	12	....	R	2	12
56	Andrew Kardner	22	Main B. H.	1	2	12	....	R	3	12
57	Bridget Buckley	48	Retreat	2	9	13	....	R	3	....
58	Jane Cunningham	60	Lodge	....	9	13	....	R	3	12
59	Mary Cullen	30	Pavilion	A	....	13	....	R	1	12
60	Elizabeth Hawkins	40	Main B. H.	1	10	14	....	R	1	12
61	Henry Dunn	31	"	1	3	14	....	R	4	....
62	James Delaney	51	"	1	1	16	....	R	6	12
63	John Donovan	24	Lodge	....	1	16	....	R	1	6
64	Sigismund Elbert	29	Main B. H.	3	1	16	....	R	3	....
65	Francis Welch	35	"	1	2	16	....	R	2	....
66	Mary Jackson	40	Retreat	1	....	16	....	R	2	....
67	Ann Moore	30	"	2	11	16	....	R	1	....
68	Mary Ann Weaver	32	"	2	2	17	....	R	1	....
69	Ann Brown	45	"	2	5	17	....	R	3	....
70	Thomas Sullivan	22	Lodge	....	6	18	....	R	....	8
71	Bridget Wilson	40	Main B	....	6	19	....	R	2	....
72	Ann Agnus Cotter	43	Lodge	....	1	20	....	R	1	12
73	Elizabeth Finn	58	Main B. H.	2	2	20	....	R	2	....
74	Michael Murphy	58	Lodge	....	8	23	....	R	....	10
75	William Barnes	37	Main B. H.	3	13	24	....	R	4	....
76	Philip Donohue	66	Lodge	....	5	24	....	R	2	10
77	Josephine McGrath	18	Main B	....	6	24	....	R	2	....
78	Bridget McCue	43	Retreat	3	6	24	....	R	2	....
79	Mary Helen Grim	53	Main B. H.	3	....	26	....	R	1	....
80	John Braden	57	"	3	25	28	....	R	2	....
81	Walter A. J. Robbins	38	"	3	....	28	....	R	....	6
82	Honora Desmond	28	Retreat	3	2	29	....	R	....	12
83	Eliza Campbell	46	Pavilion	A	9	31	....	R	....	11
84	Bridget Murray	40	Retreat	2	....	31	Sept. 2	R	2	....
85	MaryorBrid't Farrell	50	Lodge	....	5	Sept. 1	....	R	1	....
86	Ann M. Stadler	42	"	....	5	5	....	R	....	....
87	Henry Schauff	47	Main B. H.	1	....	5	....	R	1	....
88	James Bye	54	Lodge	....	4	7	12	R	5	....
89	Peter Tyrrell	39	Main B. H.	1	4	8	....	R	....	....
90	John Orchard	47	"	2	5	10	....	R	....	....
91	Eliza McWhood	34	"	3	4	11	12	R	1	....
92	George Hertsell	....	"	1	16	12	....	R	....	....
93	Susan Garland	34	"	3	3	15	16	R	1	....
94	Mary Ann Weaver	32	Retreat	1	2	15	....	R	....	....
95	Bridget Welsh	56	Pavilion	B	....	16	17	R	1	....
96	Ann Slavin	....	Retreat	3	5	20	....	R	....	....
97	James Moran	31	Main B. H.	1	....	23	25	R	2	....
98	Mary Mulshine	37	Retreat	1	2	27	28	R	1	....

RETURN OF CASES AT LUNATIC ASYLUM.

RECAPITULATION.

RETREAT.....	{ Hall 1.....	10	
	{ Hall 2.....	12	
	{ Hall 3.....	10	
		—	32
PAVILION.....	{ A	17	
	{ B	7	
		—	24
LODGE.....	{ Male	6	
	{ Female	8	
		—	14
MAIN BUILDING. {	North Wing—Male.....	18	
	South Wing—Females	10	
		—	28
Total.....			98

APPENDIX "B."

RETURN OF CASES AT THE WORK HOUSE.

No.	Names.	Age.	Time.		Attacked	Died.	Recov'd R
			Mos.	Days			
1	Fanny Little.....	19	5	5	July 22	July 23	....
2	Mary Creighton.....	40	...	5	27	27	....
3	Rose Dailey.....	40	...	5	...	...	....
4	Julia Campen.....	24	...	6	...	...	....
5	Nora Leighton.....	21	4	10	...	...	R.
6	Mary Miner.....	30	...	15	...	28	....
7	Bridget Booth.....	33	2	10	...	...	....
8	Kitty Riley.....	18	...	9	...	...	....
9	Margaret Murray.....	27	4	14	...	29	....
10	Mary Baker.....	27	3	12	...	28	....
11	Margaret Thompkins.....	25	3	15	...	31	....
12	Mary Gaffney.....	29	1	12	...	28	....
13	Bridget Beny.....	37	1	5	...	...	....
14	Catharine Smith.....	50	1	17	...	...	....
15	Mary Myers.....	40	1	22	...	Aug. 1	....
16	Mary Ann Harris.....	30	...	11	...	...	R.
17	John Haskins.....	48	...	2	...	July 28	....
18	Mary Barrows.....	56	...	14	28	29	....
19	Margaret Garraghty.....	30	3	7	...	...	....
20	Jane Smith.....	19	...	9	...	Aug. 3	....
21	Kate Bailey.....	27	5	16	...	...	R.
22	Mary Zinger.....	42	...	22	...	...	R.
23	Margaret Holmes.....	40	1	1	...	July 29	....
24	Fanny Nelson.....	23	4	20	...	Aug. 1	....
25	Lizzie Johnson.....	47	1	10	...	...	R.
26	Lizzie Hennessy.....	19	...	10	...	...	R.
27	Lena Mortoux.....	16	...	6	...	...	R.
28	Mary Bartlett.....	55	...	10	...	July 29	....
29	Michael Delaney.....	65	1	8	...	...	....
30	Hannah O'Neil.....	48	...	19	29	...	R.
31	Eliza Anderson.....	45	1	5	...	Aug. 4	....
32	Catharine O'Neil.....	39	1	21	...	July 30	....
33	Peter Leonhardt.....	46	5	26	...	...	....
34	Bridget Bell.....	45	...	12	30	Aug. 5	....
35	Jane Daley.....	49	...	6	...	July 31	....
36	Betsey Short.....	45	5	11	...	Aug. 4	....

RETURN OF CASES AT THE WORK HOUSE.—CONTINUED.

No.	Name.	Age.	Time.		Attacked	Died.	Recov'd R.
			Mos.	Days			
37	Catharine Vincent	21		15	July 30	Aug. 2	
38	Ellen Kelly	29		4		8	
39	Josephine Austin	20	1	8			R.
40	Mary Smith	22		19			R.
41	Mary J. Brogan	50		4		1	
42	John Murphy	17	1	19		July 31	
43	Margaret Sheehan	60		9		Aug. 1	
44	Edward Fife	30	5	27		July 30	
45	Alexander Lairrie	46	9 yrs		31		R.
46	John Golden	40		7		Aug. 1	
47	Margaret Smith	36		17			R.
48	Mary Connor	40	1	1		4	
49	Josephine Reed	23		4		1	
50	Catharine Johnson	54	2	11			
51	Maggie Wilson	27	1	13			R.
52	Emma Brown	25		6			
53	Rhoda Carpenter, (B)	29	3	29			R.
54	Mary Donovan	36		23		4	
55	Ellen Heffern	40		17		5	
56	Hannah Simpson	53	1	7		2	
57	Bridget Skelly	38		7	Aug. 1	8	
58	Ann Clark	28		9		2	
59	Mary Hughes	17		15			
60	Bridget McGovern	50	3			1	
61	Ann Stevens	21		22			R.
62	Louisa Johnson	45	2	23		2	
63	Margaret Johnson	25	3	1			R.
64	Jane Roberts	27		5			
65	Eliza Henderson	27	5	13			
66	Rose Boylan	48	1	24			
67	Fanny Osborne	28	2	4			R.
68	Francis Jackson (B)	42		7		6	
69	Charles Houser	17		11		1	
70	Joseph Suck	57		6		2	
71	Peter Geiser	38		3		1	
72	Michael Gleason	54	4	18		2	
73	Timothy Reynolds	42		5			
74	Mary E. Denike (B)	18		23		8	
75	Virginia Smith (B)	26	2	18			R.
76	Robert Farlow	53	1	21	2	2	
77	Thomas Hester	22		27			R.
78	Thomas Jones	24	4	27		3	
79	John Stevenson	27		19			R.
80	David S. Lyon	51		27		2	
81	George Bedford (B)	28		19			
82	Michael O'Brien	67		26		3	

RETURN OF CASES AT THE WORK HOUSE.—CONTINUED.

No.	Name.	Age.	Time.		Attacked	Died.	Recov'd	R.
			Mos.	Days				
83	Michael Grady	28	....	14	Aug. 2	Aug. 3	....	....
84	Ann Jackson	63	2	22	....	....	....	R.
85	Martha Grimes	35	5	14	....	....	....	R.
86	Margaret Morell	24	....	17	....	....	....	R.
87	Bridget McCaffrey	55	....	22	....	....	2	....
88	Mary Hayes	27	....	0	....	....	....	R.
89	Mary A. Quinn	22	....	13	....	....	....	....
90	Margaret Hopkins	26	3	20	....	....	....	....
91	Ellen Conway	36	3	1	....	....	4	....
92	Mary Watson	27	....	7	....	....	....	R.
93	Ellen Hood	65	2	21	....	....	2	....
94	Sarah Jackson (B)	16	....	5	....	....	....	R.
95	Christina Horn	18	....	23	....	....	....	R.
96	Jessie Skillman	21	....	8	....	....	....	....
97	Mary Martin	28	....	5	....	....	....	....
98	Mary Boos	40	....	8	....	....	....	....
99	Bridget O'Keefe	30	1	22	....	....	7	....
100	Emma Simpson	35	....	6	....	....	6	....
101	Patrick Muldoon	28	....	6	....	....	2	....
102	Terence Duffy	74	....	7	....	....	6	....
103	Michael Corlan .....	....	....	....	....	....	....	R.
104	Margaret Ryan	24	3	14	....	....	3	....
105	Catharine Mills	28	....	23	....	....	....	R.
106	Josephine Wilson (B)	20	2	4	....	....	....	R.
107	Mary Hennessy	30	....	15	....	....	....	....
108	Mary Wilson	28	....	4	....	....	2	....
109	John Tucker	39	....	0	....	3	8	....
110	William Wilson	40	....	10	....	....	....	R.
111	Mary Neville	33	1	28	....	....	3	....
112	Michael Dooley	25	5	....	....	....	....	....
113	Mary O'Brien	75	....	1	....	....	....	....
114	Delia Fay	30	4	20	....	....	....	R.
115	Catharine Hazard	35	....	3	....	....	4	....
116	Hannah Downey	70	....	21	....	....	4	....
117	Kate McHugh	20	....	21	....	....	6	....
118	Mary A. Williams	32	4	4	....	....	....	R.
119	Mary O'Brien	28	3	10	....	....	9	....
120	Mary McDonnell	52	2	7	....	....	5	....
121	Eliza Hagan	27	4	11	....	....	9	....
122	Mary Smith	21	2	8	....	....	8	....
123	Carl Voreeath	34	....	20	....	....	....	R.
124	William Conlan	18	....	24	....	....	....	R.
125	Robert McMahon	14	....	21	....	....	....	R.
126	Samuel Martin (B)	21	....	4	....	....	....	R.
127	Thomas Tichenor	31	....	20	....	....	....	R.
128	Joseph Eschenbach	30	2	24	....	....	....	R.

RETURN OF CASES AT THE WORK HOUSE.—CONTINUED.

No.	Names.	Age.	Time.		Attacked	Died.	Recov'd R.
			Mos.	Days			
129	George Nellis.....	29	...	0	Aug. 3	Aug. 11	...
130	William Gaylor.....	46	2	16	...	...	R.
131	John Smith.....	40	3	28	...	7	...
132	John Logue.....	32	5	24	...	5	...
133	Francis Masterson.....	42	...	26	...	3	...
134	William Montgomery.....	20	1	21	...	...	...
135	Pasquedie Cordy.....	26	3	9	...	...	...
136	Michael Dailey.....	44	...	15	...	...	R.
137	John Fuller.....	68	...	27	...	...	R.
138	Mary Donovan.....	36	...	26	...	4	...
139	Jane Hoy.....	32	...	6	4	...	...
140	Ann Baker.....	40	...	8	...	5	...
141	Kate Vance.....	26	3	21	...	...	R.
142	Ann Trainor.....	17	...	4	...	...	R.
143	Ann Mills.....	19	1	15	...	4	R.
144	Mary Bechannon.....	54	1	14	...	...	...
145	Lottie Edwards.....	22	3	11	...	...	...
146	Michael McClusky.....	...	...	...	...	...	R.
147	Michael Malone.....	23	1	15	...	...	R.
148	Thomas Tobin.....	60	...	8	...	...	...
149	John Kelly.....	41	2	6	...	...	...
150	Josephine Woodruff.....	22	...	25	...	7	...
151	Eliza Baker.....	22	...	6	...	5	...
152	Isabella Jones.....	42	...	4	...	...	...
153	William Finlay.....	00	...	7	...	...	...
154	George W. James.....	17	...	5	...	...	R.
155	Matthew McNally.....	21	2	9	...	...	R.
156	Michael Hackett.....	48	...	8	...	...	...
157	William Lynch.....	37	3	9	...	...	...
158	Mary Baker.....	20	...	1	...	...	...
159	Jane Doyle.....	49	3	7	...	...	...
160	Charles Tuttle.....	33	...	0	5	7	...
161	Catharine Riley.....	44	...	29	...	...	R.
162	Delia Kavanah.....	23	...	29	...	...	...
163	John Foley.....	50	...	27	...	5	...
164	James Patterson.....	55	...	7	...	...	...
165	Henry Wilson (B).....	49	...	26	...	...	R.
166	Ellen Murdock.....	18	...	7	...	11	...
167	Edward Sweeny.....	36	...	27	...	5	...
168	Mary Johnson (B).....	23	...	3	...	8	...
169	Catharine Duffy.....	26	...	4	...	...	R.
170	Eliza M. Carson.....	37	...	5	...	6	...
171	John Moore.....	28	...	2	...	7	...
172	Susan Seine.....	34	...	6	6	...	R.
173	Julia Sullivan.....	19	...	21	...	11	...
174	Leroy Harrington.....	45	...	11	...	8	...

RETURN OF CASES AT THE WORK HOUSE.—CONTINUED.

No.	Name.	Age.	Time.		Attacked	Died.	Recov'd R.
			Mos.	Days			
175	John Brownlee.....	34	....	25	Aug. 6	Aug. 9	....
176	Catharine Kelly.....	39	....	4	.. 7	.. 8	....
177	Mary McMamara.....	42	....	..	.. 8	.. ..	....
178	Marcus Polinths.....	63	1	9	.. ..	.. 9	....
179	Caroline Redman.....	21	..	7	.. 9	.. 13	....
180	Ellen McCauley.....	26	....	2	.. 10	.. ..	....
181	Mary A. Sebastopol.....	34	....	21	.. 11	.. 15	....
182	Ann Bauner.....	39	....	7	.. 13	.. 14	....
183	Rosannah Mack.....	25	....	5	.. 14	.. 15	....
184	George McMenomy.....	69	....	12	.. ..	.. 20	....
185	Rosa McDermott.....	20	....	6	.. 15	.. 15	....
186	Mary Quinn.....	25	....	14	.. ..	.. 16	....
187	Mary McKenna.....	68	....	6	.. ..	.. ..	....
188	Owen McDonald.....	65	....	8	.. ..	.. 19	....
189	Mary Kelly.....	30	....	14	.. 16	....	R.
190	Catharine Dorsey.....	25	1	10	.. 20	.. 23	....
191	Mary Pearsall.....	30	....	6	.. ..	.. ..	R.
192	Mary Benson.....	50	....	4	Sept. 6	Sept. 8	....
193	Charles Laborda.....	65	....	23	.. 11	.. 13	....
194	Thomas Riley.....	25	....	4	.. 13	.. 14	....
195	Mary A. Mallon.....	22	....	20	.. ..	.. ..	....
196	Thomas Healey.....	40	....	3	.. ..	.. 15	....
197	John T. Butler.....	22	....	4	.. 14	.. ..	....
198	William Maher.....	60	....	5	.. ..	.. ..	....
199	Laurence Coman.....	38	....	6	.. ..	.. ..	....
200	August Longshaw.....	46	....	7	.. 15	.. 16	....
201	Jane Smith.....	24	....	17	.. 16	.. 17	....
202	Dennis Fay.....	19	....	6	.. 20	.. 21	....
203	James Flahey.....	40	....	20	.. 22	.. 23	....
204	William Campbell.....	52	....	15	.. 23	.. 24	....

APPENDIX "C."

RETURN OF CASES AT THE ALMS HOUSE.

No	Name.	Age.	Ward.	Time.			Attacked	Died.		Recov'd.
				Yrs.	Mos.	Days				
1	Catharine Tighe.....	35	54	2	6	....	July 30	July 30	....
2	Mary Donnelly.....	38	..	..	2	....	..	..	31	..
3	Mary Farren.....	29	..	..	1	....	..	..	..	..
4	Annie E. Conniton..	31	..	1	10	....	..	..	..	..
5	John Verlandis.....	18	2	2	4	....	31	..	..	..
6	Susan Manning.....	54	54	4	3	....	..	..	..	..
7	Mary Reed.....	21	..	..	1	....	..	..	..	..
8	Irene Spencer.....	25	..	2	4	....	..	..	..	..
9	Ann Riley.....	30	..	1	..	....	..	Aug.	1	..
10	Mary Manning.....	51	..	..	10	....	..	Aug.	..	..
11	Catharine McGrath..	54	..	4	2	....	..	..	..	..
12	Elizabeth Dott.....	51	..	5	3	....	..	..	2	..
13	Mary Kesnett.....	46	..	1	..	....	..	..	..	..
14	Catharine Hurley....	51	..	1	2	....	..	..	..	..
15	Louise Valland.....	36	33	6	11	....	Aug. 1	..	..	..
16	Ann Hicks.....	44	54	2	11	....	..	..	..	..
17	Ann E. Rodgers.....	30	..	..	4	....	..	..	..	..
18	Mary Borgstader....	45	45	..	2	....	2	..	3	..
19	Mary O'Brien.....	50	54	..	10	....	..	..	..	..
20	Thomas Knowles.....	28	24	..	4	....	..	..	4	..
21	Eva Crumbie.....	30	54	..	..	....	3	..	..	R.
22	Carrie Gee.....	16	..	..	..	....	..	..	..	R.
23	R. Barry.....	26	..	..	..	....	..	..	..	R.
24	Kate McGue.....	35	..	..	2	15	4	..	..	..
25	John Gordon.....	23	27	..	2	15	..	..	..	..
26	Margaret Murray....	73	28	1	..	....	..	..	..	..
27	Bridget Noon.....	100	26	..	..	25	..	..	..	R.
28	C. Earley.....	58	B H	..	..	....	..	..	..	R.
29	M. Rose.....	40	N	..	..	....	..	..	..	R.
30	Robert McFarland....	60	G H	..	..	....	..	..	..	..
31	Margaret Delaney....	40	54	..	1	....	..	..	..	..
32	Mary Cowan.....	35	..	1	5	....	..	..	..	R.
33	James Murphy.....	40	..	..	..	....	5	..	5	..
34	Catharine Robertson	43	54	..	2	....	..	..	..	..
35	Rosanna Eckhardt..	53	..	2	10	....	..	..	..	..
36	Helena Meyers.....	24	50	1	..	....	..	..	7	..

RETURN OF CASES AT THE ALMS HOUSE.—CONTINUED.

No	Name.	Age.	Ward	Time.			Attacked	Died.	Recovered.
				Yrs.	Mos.	Days			
37	Elizabeth Swanzer..	22	50	....	3	....	Aug. 5	July 10	....
38	Elizabeth Albro.....	60	54	....	21	....	..	5	....
39	Michael Fritz.....	69	22	....	4	....	..	..	....
40	Ann Edwards.....	60	36	4	3	....	..	..	....
41	Ellen Flanagan.....	31	45	1	22	....	..	..	....
42	Mary A. Romer.....	57	39	7	10	....	..	6	....
43	Morris Kelly.....	30	22	....	1	....	6	7	....
44	William Carroll.....	29	27	....	3	....	..	..	....
45	Catharine Irvin.....	78	31	1	10	....	..	..	....
46	Thomas Shaves.....	75	C H	1	....	....	..	..	....
47	Samuel Gubbins.....	39	3	1	3	....	..	6	....
48	Jane Hays.....	59	35	1	11	....	..	11	....
49	Catharine Williams..	15	25	1	5	....	..	7	....
50	John Connolly.....	40	....	5	2	....	7	..	....
51	Ann Huestis.....	49	36	3	9	....	..	..	....
52	Joseph Roshon.....	59	A H	4	2	....	..	..	....
53	Bridget Connolly.....	32	47	....	5	....	..	8	....
54	Thomas Muir.....	65	28	....	2	....	..	9	....
55	Catharine Moran.....	45	33	....	2	....	8	..	....
56	C. Stultz.....	68	3	....	..	....	..	..	R.
57	Charles Miller.....	56	2	....	..	....	9	11	....
58	Ann Mons.....	71	37	....	..	....	..	12	....
59	Patrick Seagriff.....	52	....	....	..	....	..	18	....
60	Harriet Adams.....	38	28	....	..	....	10	11	....
61	Mary Carr.....	56	38	....	..	....	11	12	....
62	Mathew Furst.....	45	A H	....	..	....	..	14	....
63	Alice Cronin.....	42	38	....	..	....	12	12	....
64	Mary Hind.....	20	45	....	7	....	..	..	....
65	Catharine Edwards..	61	33	7	4	....	..	18	....
66	H. Welch.....	30	41	....	..	....	..	..	R.
67	Hannah Fitzgerald..	28	50	....	..	....	..	..	R.
68	Sarah Mahan.....	80	28	....	1	....	13	13	....
69	Mary Fitzpatrick.....	55	34	9	1	....	..	..	....
70	Catharine Garrigan..	50	26	....	2	....	14	14	....
71	Catharine Talbot.....	66	27	2	....	....	..	..	....
72	Julia Gibbons.....	21	40	....	5	....	..	..	....
73	Catharine Fagan.....	28	54	3	11	....	..	15	....
74	Ellen Coyle.....	61	52	1	....	11	15	..	....
75	William Thompson..	50	5	....	..	....	..	..	R.
76	Hannah Negan.....	30	39	....	..	....	..	..	R.
77	Rachel Van Doran..	33	..	....	..	....	16	..	R.
78	S. A. Edwards.....	55	3	....	..	....	..	..	....
79	Sarah Murray.....	31	28	....	1	15	..	17	....
80	Philip Hannavan.....	Inf't	33	....	1	21	..	17	18
81	Margaret Reddy.....	39	32	9	1	....	..	18	19
82	Fanny Hanon.....	67	28	3	6	....	..	19	..

RETURN OF CASES AT THE ALMS HOUSE.—CONTINUED.

No	Name.	Age.	Ward.	Time.			Attacked	Died.	Recovered.
				Yrs.	Mos.	Days			
83	Ellen Mitchell.....	46	27	....	10	....	Aug. 19	Aug. 19	....
84	Hannah Dean.....	70	30	1	2	....	..	20	..
85	Joanna Cusick.....	28	49	....	....	....	..	..	R.
86	Maggie Handley.....	16	41	....	....	....	..	..	R.
87	B. Kankerbecker.....	80	N B	....	....	....	20	..	R.
88	Catharine Barry.....	40	27	....	....	....	..	..	R.
89	Eliza Holland.....	35	34	....	....	....	..	..	R.
90	Joshua Folk.....	59	14	....	10	....	..	21	..
91	Ebenezer Amos.....	65	..	....	3	....	21	..	..
92	Jane McKeown.....	34	50	....	9	....	..	27	..
93	— Shepherd.....	25	B H	....	....	....	..	..	R.
94	Mary Ryan.....	23	53	7	....	....	22	24	..
95	Mary Grant.....	23	28	....	1	15	..	..	..
96	Christina Van Deusen	76	..	....	2	....	23	..	..
97	Rose McCarty.....	70	25	....	6	....	..	..	..
98	Susan O'Rielly.....	21	50	4	6	....	..	..	..
99	Jane Drew.....	52	28	....	2	....	..	..	..
100	Catharine Smith.....	51	32	....	1	15	..	25	..
101	John Mead.....	54	21	1	1	....	24	24	..
102	Margaret Leahy.....	33	26	4	10	....	..	..	..
103	Mary Baker.....	61	39	5	1	....	25	26	..
104	Mary Mehan.....	61	26	....	1	....	..	25	..
105	Fanny O'Brien.....	26	50	....	27	....	..	29	..
106	John Neale.....	69	8	4	....	....	30	30	..
107	Ann Stafford.....	60	54	....	....	....	Sept. 6	Sept. 9	..
108	George Reed.....	48	4	1	4	....	7	13	..
109	Sarah Price.....	58	36	....	....	....	10	..	R.
110	James Greighton.....	72	9	1	10	....	11	12	..
111	Ann Sharidan.....	51	....	....	4	....	12	17	..

APPENDIX "D."

RETURN OF CASES AT THE PENITENTIARY.

No	Names.	Age.	Time.		Attacked	Died.	Recov'd.
			Mos.	Days.			
1	Daniel Hand.....	22	2	25	July 30	.....	R.
2	William Buckley.....	35	8	23	.. 21	July 31	.....
3	Maggie Manhattan.....	18	3	6	Aug. 1	.....	R.
4	Patrick McDonald.....	23	2	11	.. 2	.....	R.
5	George Phillips.....	25	1	24	.. ..	.....	R.
6	Henry Samuels.....	.....	.....	23	.. ..	.....	R.
7	Albert Miller.....	21	1	5	.. ..	Aug. 16	.....
8	Alex. Adams.....	26	.....	28	.. 4	.. 16	.....
9	Thomas Smith.....	21	2	13	.. ..	.. 8	.....
10	Thomas McCormack.....	38	.....	25	.. ..	.. 7	.....
11	Chas. Wannamaker.....	22	2	20	.. ..	.. 6	R.
12	Anne Hines.....	45	8	22	.. 5	.....	R.
13	George Phinney.....	34	4	1	.. 7	.....	.....
14	Wm. Smith.....	48	1	15	.. ..	.. 7	.....
15	Francis B. Kennedy.....	22	1	.....	.. 10	.....	R.
16	Edward Lynch.....	27	.....	$\frac{1}{2}$	.. 12	.....	R.
17	Henry Bremer.....	19	.....	2	.. ..	.....	R.
18	Leon Durand.....	22	3	12	.. 14	.....	R.
19	Mary Ann Williams.....	27	.....	30	.. 20	.....	R.

APPENDIX "E."

RETURN OF CASES AT CHARITY HOSPITAL.

No	Names.	Age.	Ward.		Time.		Attacked	Died.	Recovered.
			M.	F.	Mos.	Days			
1	John McGowan.....	28	8	.....	1	12	July 9	.....	R.
2	James Hatton.....	45	5	.....	.....	.....	20 July 21	.....	.....
3	Thomas Conroy.....	50	Lent	.....	3	11	..... 21	.....	R.
4	A. Swift, alias Bindell	22	.....	6	.....	1	31	.....	R.
5	Eliza Cowan.....	29	.....	2	.....	.....	Aug. 3 Aug.	5	.....
6	Ellen Clifton.....	20	.....	5	.....	14	.....	7	.....
7	Enoch Holland.....	47	2	.....	.....	21	.....	5	.....
8	Mary Ryan.....	.....	.....	3	.....	3	4	8	.....
9	Mary Kane.....	28	.....	13	3	12	5	6	.....
10	Mary Barden.....	55	S P	Hos	3	26	.....	.....	.....
11	Ann Fay.....	40	.....	12	2	18	.....	.....	.....
12	Thomas Gidney.....	60	5	.....	1	14	.....	.....	.....
13	Robert Clark.....	34	5	.....	1	14	.....	.....	.....
14	Ellen Barry.....	36	.....	16	4	6	.....	.....	.....
15	Fanny Ward.....	19	.....	14	6	16	.....	7	.....
16	Susan Murphy.....	25	.....	4	5	5	7	8	.....
17	Jane Berry (B).....	39	.....	16	.....	3	.....	9	.....
18	Kate McCauley.....	25	.....	4	4	19	.....	8	.....
19	Lottie Smith.....	25	.....	2	.....	20	.....	.....	.....
20	Bridget McIntyre.....	70	.....	12	2	7	8	9	.....
21	Charles Manning.....	49	Pri'e	room	.....	.....	.....	.....	.....
22	James Fallon.....	65	10	.....	2	22	.....	10	.....
23	Cath. Welsh.....	26	.....	6	4	2	9	.....	.....
24	Robert Archless.....	30	1	.....	.....	10	10	11	.....
25	Mary A. Swain.....	32	.....	9	.....	6	.....	.....	.....
26	Ann Cushman.....	59	.....	13	2	25	.....	.....	.....
27	William O'Hara.....	65	2	.....	.....	10	.....	.....	.....
28	Robert O'Brien.....	33	10	.....	.....	17	11	.....	.....
29	Michael Maloney.....	50	10	.....	2	26	.....	12	.....
30	Bridget Curran.....	65	.....	12	.....	20	.....	.....	.....
31	Catharine Riley.....	47	.....	2	.....	1	.....	.....	.....
32	Rosanna Hamilton.....	23	.....	10	1	24	.....	13	.....
33	John Davy.....	35	10	.....	.....	22	13	14	.....
34	Mary Johnson.....	23	.....	16	.....	28	.....	.....	.....
35	Augusta Potter.....	22	.....	16	.....	15	14	16	.....
36	William Marvin.....	45	10	.....	1	2	.....	18	.....

RETURN OF CASES AT CHARITY HOSPITAL.—CONTINUED.

No	Names.	Age.	Ward.		Time.		Attacked	Died.	Recov'd.
			M.	F.	Mos.	Days			
37	Matthew Fuller.....	58	2	....	2	2	July 15	Aug. 15	....
38	Mary Eckles.....	19	....	3	....	21	.. ..	.. 18	R.
39	William Graham....	57	13	....	1	12	.. ..	.. ..	....
40	Elizabeth McAuley..	22	....	6	1	19	.. 17	.. ..	....
41	Margaret Cheesbro..	26	....	9	7	9	.. ..	.. 19	....
42	Catharine Dickerson.	20	....	1	....	4	.. ..	.. 22	....
43	Patrick McKenna...	35	10	....	....	16	.. 18	....	R.
44	Julia Smith.....	23	....	9	1	11	.. ..	....	R.
45	Emma Hays.....	28	....	16	7	19	.. 19	....	R.
46	Ellen Martin.....	34	....	5	2	16	.. 22	.. 23	....
47	Margaret Fitch.....	25	....	9	3	29	.. 25	.. 36	....
48	Amelia Roach.....	40	....	9	1	19	.. 26	.. 27	....
49	Charles Carrol.....	50	....	13	....	....	Sept. 10	Sept. 12	....
50	Mary Conway.....	22	....	....	1	....	.. 12	....	R.

Appendix "F" — (Continued).

DATE.	July				August				September				October				November				December				Total				Daily Average				Percentage of deaths on total No. Inmates.																
	Number of Mother's Children in Build- ing.	Deaths among same.	Number of Nurse- Children in Build- ing.	Deaths among same.	Total Number In- fants in Building.	Total Number of Deaths.	DATE.	Number of Mother's Children in Build- ing.	Deaths among same.	Number of Nurse- Children in Build- ing.	Deaths among same.	Total Number In- fants in Building.	Total Number of Deaths.	DATE.	Number of Mother's Children in Build- ing.	Deaths among same.	Number of Nurse- Children in Build- ing.	Deaths among same.	Total Number In- fants in Building.	Total Number of Deaths.	DATE.	Number of Mother's Children in Build- ing.	Deaths among same.	Number of Nurse- Children in Build- ing.	Deaths among same.	Total Number In- fants in Building.	Total Number of Deaths.	DATE.	Number of Mother's Children in Build- ing.	Deaths among same.	Number of Nurse- Children in Build- ing.	Deaths among same.	Total Number In- fants in Building.	Total Number of Deaths.	DATE.	Number of Mother's Children in Build- ing.	Deaths among same.	Number of Nurse- Children in Build- ing.	Deaths among same.	Total Number In- fants in Building.	Total Number of Deaths.								
July 1.....	82	..	71	..	154	1	July 22.....	78	..	71	..	149	1	Aug. 12.....	68	..	68	..	136	..	Aug. 13.....	68	..	149	1	Aug. 13.....	68	..	68	..	136	..	Aug. 13.....	68	..	68	..	136	..	Aug. 13.....	68	..	68	..	136	..			
2.....	82	..	71	..	153	..	23.....	78	..	71	..	153	..	14	68	..	70	..	153	..	14	68	..	153	..	14	68	..	70	..	153	..	14	68	..	70	..	153	..	14	68	..	70	..	153	..			
3.....	81	1	72	..	153	2	24.....	79	..	73	..	153	3	15	68	..	71	..	153	..	15	68	..	153	..	15	68	..	71	..	153	..	15	68	..	71	..	153	..	15	68	..	71	..	153	..			
4.....	81	1	72	..	153	..	25.....	79	..	73	..	153	..	16	68	..	71	..	153	..	16	68	..	153	..	16	68	..	71	..	153	..	16	68	..	71	..	153	..	16	68	..	71	..	153	..			
5.....	81	1	67	..	148	6	26.....	71	..	71	..	149	..	17	68	..	71	..	149	..	17	68	..	149	..	17	68	..	71	..	149	..	17	68	..	71	..	149	..	17	68	..	71	..	149	..			
6.....	77	2	66	..	143	4	27.....	67	..	73	..	138	..	18	68	..	71	..	138	..	18	68	..	138	..	18	68	..	71	..	138	..	18	68	..	71	..	138	..	18	68	..	71	..	138	..			
7.....	77	..	67	..	144	..	28.....	67	..	73	..	140	..	19	68	..	71	..	140	..	19	68	..	140	..	19	68	..	71	..	140	..	19	68	..	71	..	140	..	19	68	..	71	..	140	..			
8.....	77	..	69	..	146	..	29.....	69	..	69	..	138	..	20	68	..	69	..	138	..	20	68	..	138	..	20	68	..	69	..	138	..	20	68	..	69	..	138	..	20	68	..	69	..	138	..			
9.....	77	..	69	..	146	..	30.....	69	..	69	..	138	..	21	68	..	69	..	138	..	21	68	..	138	..	21	68	..	69	..	138	..	21	68	..	69	..	138	..	21	68	..	69	..	138	..			
10.....	76	..	72	..	148	6	31.....	67	..	64	..	129	..	22.....	68	..	64	..	129	..	22	68	..	129	..	22	68	..	64	..	129	..	22	68	..	64	..	129	..	22	68	..	64	..	129	..			
11.....	76	..	73	..	150	1	Ang. 1.....	68	..	65	..	134	..	23.....	68	..	65	..	134	..	23	68	..	134	..	23	68	..	65	..	134	..	23	68	..	65	..	134	..	23	68	..	65	..	134	..			
12.....	78	..	75	..	153	..	2.....	70	..	61	..	137	..	24.....	71	..	61	..	137	..	24	71	..	137	..	24	71	..	61	..	137	..	24	71	..	61	..	137	..	24	71	..	61	..	137	..			
13.....	78	..	73	..	150	..	3.....	70	..	59	..	137	..	25.....	71	..	59	..	137	..	25	71	..	137	..	25	71	..	59	..	137	..	25	71	..	59	..	137	..	25	71	..	59	..	137	..			
14.....	78	..	72	..	149	3	4.....	74	..	59	..	137	..	26.....	73	..	59	..	137	..	26	73	..	137	..	26	73	..	59	..	137	..	26	73	..	59	..	137	..	26	73	..	59	..	137	..			
15.....	77	..	72	..	149	..	5.....	78	..	59	..	137	..	27.....	72	..	59	..	137	..	27	72	..	137	..	27	72	..	59	..	137	..	27	72	..	59	..	137	..	27	72	..	59	..	137	..			
16.....	77	..	72	..	149	..	6.....	78	..	59	..	137	..	28.....	68	..	57	..	137	..	28	68	..	137	..	28	68	..	57	..	137	..	28	68	..	57	..	137	..	28	68	..	57	..	137	..			
17.....	77	..	67	..	145	5	7.....	69	..	57	..	126	..	29.....	66	..	56	..	126	..	29	66	..	126	..	29	66	..	56	..	126	..	29	66	..	56	..	126	..	29	66	..	56	..	126	..			
18.....	78	1	70	..	148	1	8.....	68	..	56	..	124	..	30.....	66	..	55	..	124	..	30	66	..	124	..	30	66	..	55	..	124	..	30	66	..	55	..	124	..	30	66	..	55	..	124	..			
19.....	75	..	71	..	146	3	9.....	71	..	55	..	126	..	31.....	70	..	55	..	126	..	31	70	..	126	..	31	70	..	55	..	126	..	31	70	..	55	..	126	..	31	70	..	55	..	126	..			
20.....	76	..	73	..	149	2	10.....	67	..	53	..	120	..	Sept. 1.....	68	..	53	..	120	..	Sept. 1.....	68	..	120	..	Sept. 1.....	68	..	53	..	120	..	Sept. 1.....	68	..	53	..	120	..	Sept. 1.....	68	..	53	..	120	..			
21.....	75	..	73	..	148	5	11.....	68	..	53	..	121	..	2.....	68	..	53	..	121	..	2	68	..	121	..	2	68	..	53	..	121	..	2	68	..	53	..	121	..	2	68	..	53	..	121	..			
Total.....	1635	11	1480	33	3124	44	Total.....	1492	13	1355	54	2847	67	Total.....	1447	5	1094	28	2541	33	Total.....	1447	5	1094	28	2541	33	Total.....	1447	5	1094	28	2541	33	Total.....	1447	5	1094	28	2541	33	Total.....	1447	5	1094	28	2541	33	
Daily Average...	77.85	0.52	70.90	1.57	148.76	2.09	Daily Average...	21.05	0.62	64.52	2.57	35.57	3.19	Daily Average...	68.90	0.24	52.10	1.33	122.00	1.57	Daily Average...	68.90	0.24	52.10	1.33	122.00	1.57	Daily Average...	68.90	0.24	52.10	1.33	122.00	1.57	Daily Average...	68.90	0.24	52.10	1.33	122.00	1.57	Daily Average...	68.90	0.24	52.10	1.33	122.00	1.57	
Percentage of deaths on total No. Inmates.	0.67	2.22	1.41	Percentage of deaths on total No. Inmates.	0.88	3.98	2.35	Percentage of deaths on total No. Inmates.	0.34	2.58	1.30	Percentage of deaths on total No. Inmates.	0.34	2.58	1.30	Percentage of deaths on total No. Inmates.	0.34	2.58	1.30	Percentage of deaths on total No. Inmates.	0.34	2.58	1.30	Percentage of deaths on total No. Inmates.	0.34	2.58	1.30	Percentage of deaths on total No. Inmates.

APPENDIX "G."

Return of Cases at Ward's Island.

No.	NAME.	Time at Workhouse.	Time.		Attack.	Died.	Recovered.
		Days.	Mos.	Days			
1	Peter Ford (1).	2	....	2	July 27.	July 28.	
2	Hugh McCann.	29	....	....	" 29.	" 29.	
3	Henry Stiver (2). . . . .	....	....	....	" 29.	" 31.	
4	Mary Gilmartin (3)	3	1	8	" 29.	....	Recov.
5	Eliza Edge.	8	....	16	" 29.	....	Recov.
6	Thomas Barrett (4)	23	....	28	" 30.	" 30.	
7	Michael Kennedy.	3	1	4	" 30.	" 30.	
8	Jaue Diltz. . . . .	....	....	....	" 30.	" 31.	
9	Peter Reilly (6) . . . . .	....	1	5	" 31.	....	Recov.
10	William Mor. (.)	9 mos.	....	30	Aug. 1.	Aug. 2.	
11	Hattie Day (6)	3 days.	....	3	" 2.	" 4.	
12	William Lynch. . . . .	....	....	....	" 2.	" 5.	
13	William Scott. . . . .	....	....	....	" 3.	....	Recov.

(.) Peter Ford came, with four others, from the Workhouse, July 25th; the other four escaped the cholera.

(2.) Henry Stiver and William Moore, both lunatics, were employed in the pit burying the dead.

(3.) Mary Gilmartin came from Workhouse, July 23d, the day the first case died there.

(4.) Thomas Barrett was nurse to cases Nos. 1 and 2.

(5.) Peter Reilly the night before his attack, had laid in some hay upon which the corpses of the previous cholera patients had been laid during the night.

(6.) Hattie Day came from Workhouse four days previous to attack.

About fifty men were employed on Ward's Island, part of whom worked in the Cemetery. They all slept in one large room. The sick were placed in a tent, erected for that purpose.

Where time is not stated, patients are supposed to have been from the Almshouse.

APPENDIX "H."

MEAL.	ARTICLES.	PENITENTIARY.	ALMSHOUSE.	WORKHOUSE.	LUNATIC ASYLUM.
Breakfast.	Bread	10 oz. 1½ pints.	Daily ration, 20 oz. 1½ pints.	10 oz. 1½ pints.	Daily ration, 22 oz. 1½ pints.
	Rye Coffee				
Dinner.	Fresh Beef	1 lb. 5 days per week.	1 lb 2 days per week.	1 lb 5 days per week.	½ lb. 4 days per week.
	Salt Beef	¾ lb. " "	¾ lb 1 day "	¾ lb 2 " "	.....
	Stew of salt pork with } vegetables. .... }	.....	.....	.....	1 day per week.
	Mutton Stew .....	.....	.....	.....	1 day per week.
	Bean soup with salt beef.	1½ pints 1 day per week.	1½ pints 1 day per week.	1½ pints 1 day per week.	.....
	Mush and molasses .....	.....	1 day per week.	.....	1 day per week.
	Bread	From daily ration.	From daily ration.	.....	From daily ration.
	Vinegar	A small quantity	Issued to each person as required.	8 oz.	.....
	Soup of beef & vegetables	1½ pints 5 days per week	1½ pints 5 days per week.	1½ pints 6 days per week.	1½ pints 4 days per week.
Supper.	Mush	Containing 3@4 oz. meal	.....	1½ pts. cont'g 3 oz. meal.	.....
	Bread .....	.....	From daily ration.	.....	From daily ration.
	Rye Coffee	1½ pints,	1½ pints.	.....	.....
	Tea .....	.....	.....	.....	1½ pints.

APPENDIX "I."

Daily Meteorological Observations, with Daily Number of Cases and Deaths at each Institution, with Totals.

DATE.	PREVAILING.		Humidity. Saturation 100°	Mean Thermometer.	Lunatic Asylum.		Alms House.		Penitentiary.		Charity Hospital.		Total B. I.		Ward's Island (Grave Diggers)	
	WIND.	WEATHER.			Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
July 9.																
20	N. E.	Light rain.	70	65							1		1			
21	N. E. and S.	Cloudy	63	74							1		1			
22	N. W.	Clear.	74	78	1	1										
23	S. W.	Variable.	63	78							1		1			
24	S. W.	Variable.	75	78												
25	S. W.	Variable.	68	78	1	1										
26	South.	Variable and sultry.	77	78	2											
27	South.	Variable and sultry.	73	77	4											
28	South.	Cloudy	59	75	1	16										
29	South.	Clear and sultry.	75	73	2	12										
30	North.	Variable.	58	77	4	6										
31	S. W.	Variable.	76	77	1	11										
Aug. 1.	S. W.	Warm, rainy.	78	76	1	12										
2.	S. W.	Variable.	69	75	1	11										
3.	West.	Clear, dry.	79	73	6	11										
4.	S. W.	Variable.	36	75	5	23										
5.	S. W.	Variable.	58	73	3	33										
6.	S. W.	Clear, very dry.	71	85	3	20										
7.	S. W.	Variable.	55	72	7	13										
8.	S. W.	Variable.	72	72	6	15										
9.	S. W.	Variable.	73	72	4	8										
10.	N. E.	Rainy.	81	69	3	2										
11.	N. W.	Clear and very dry.	69	65	2	9										
12.	S. W.	Clear and very dry.	73	60	3	1										
13.	N. E.	Rain.	87	85	1	8										
14.	N. E.	Rainy.	71	80	2	4										
15.	N. E.	Rainy.	72	70	2	3										
16.	North.	Clear, very dry.	32	64	1	2										
17.	North.	Clear, very dry.	42	70	2	1										
18.	S. W.	Clear, very dry.	73	60	2	2										
19.	S. E.	Rainy.	74	70	1	4										
20.	West.	Mostly clear.	42	68	2	1										
21.	South.	Mostly clear.	70	60	1	1										
22.	S. W.	Mostly clear.	75	55	3	1										
23.	S. W.	Mostly clear.	61	65	1	1										
24.	S. W.	Cool and clear.	65	60	4											
25.	S. W.	Windy and clear.	55	65												
26.	S. W.	Windy and clear.	66	66												
27.	S. W.	Variable, damp.	70	43	1	2										
28.	S. E.	Variable, damp.	74	65	2	2										
29.	West.	Variable, damp.	72	55	1	1										
30.	S. E.	Variable, damp.	74	55												
31.	S. E.	Cloudy, sultry.	77	61	2	1										
Sept 1.	S. E.	Variable.	78	59	1	1										
2.	S. E.	Variable.	80	66	2	2										
3.	S. E.	Variable.	82	72	2	2										
4.	S. E.	Cloudy.	77	70												
5.	S. E.	Variable.	78	71	2	1										
6.	S. E.	Variable.	75	60	1	1										
7.	S. E.	Fog A. M., rain P. M.	50	50	1	1										
8.	S. W.	Clear.	73	50	1	1										
9.	West.	Clear.	69	38												
10.	S. W.	Fine.	70	66												
11.	S. E.	Rainy.	72	72	1	1										
12.	S. W.	Clear.	76	59	2	1										
13.	S. W.	Fine.	73	38	1	1										
14.	S. E.	Cloudy, rain P. M.	70	65	3	1										
15.	N. W.	Fine.	57	38	2	2										
16.	West.	Fine.	51	38	1	1										
17.	S. E.	Cloudy, damp.	67	64	1	1										
18.	S. E.	Cloudy, damp.	72	71												
19.	N. to S.	Rainy.	70	65												
20.	N. E.	Rainy.	69	95	1											
21.	East.	Clear.	70	85												
22.	N. W.	Clear.	60	40												
23.	N. W.	Clear.	55	50												
24.	N. E.	Cloudy.	58	58												
25.	S. E.	Clear, damp.	67	71	1											
26.	S. E.	Rainy.	72	90												
27.	N. W.	Fine.	60	50												
28.	East.	Fine.	66	60												
29.	N. W.	Cloudy.	73	65												
30.	N. W.	Variable.	30	70												
Total.			98	72	204	149	111	90	19	7	50	42	482	360	13	9
Per centage of Deaths.			73.47		73.04		81.08		36.84		84.00		74.68		69.23	

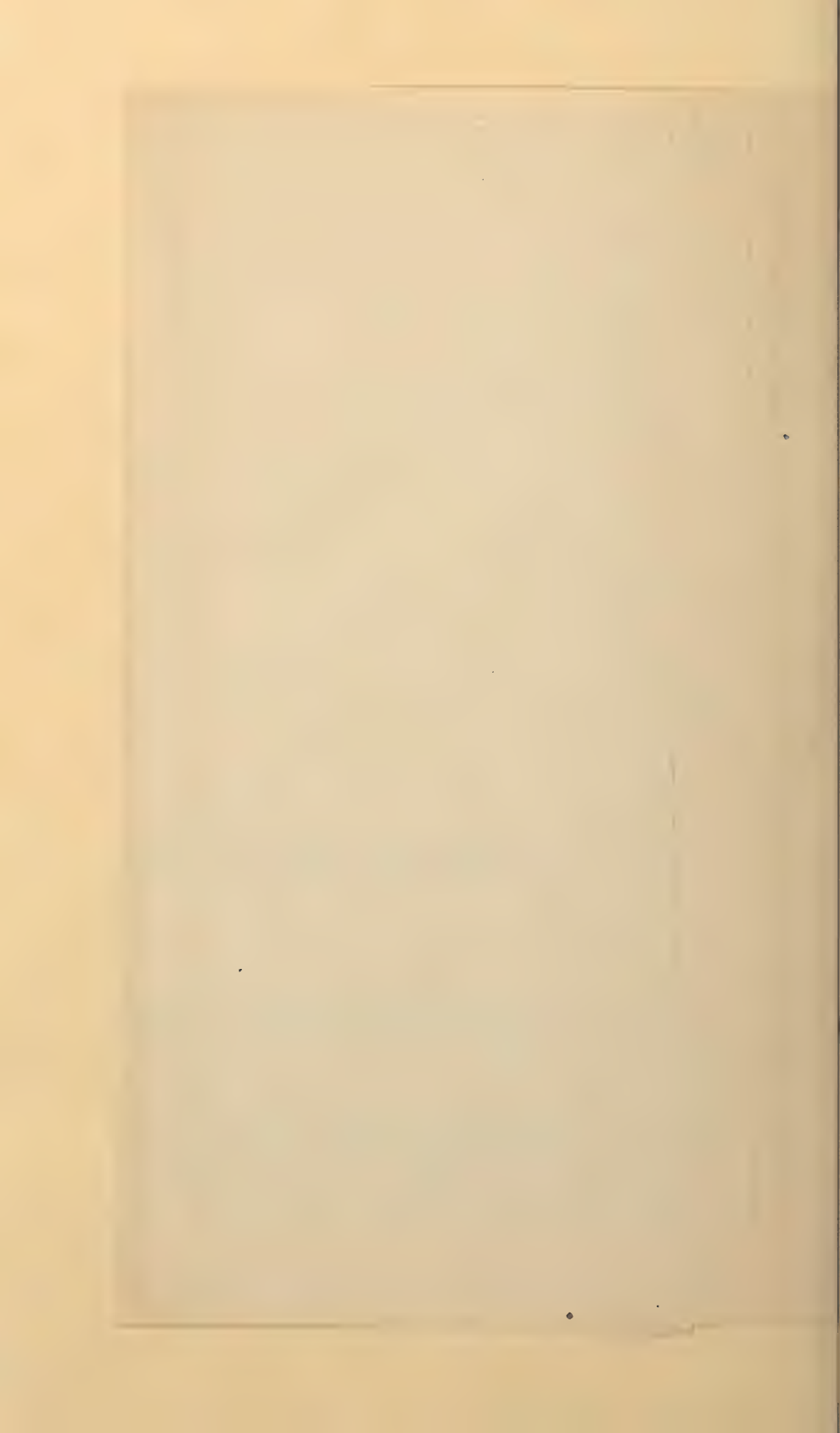
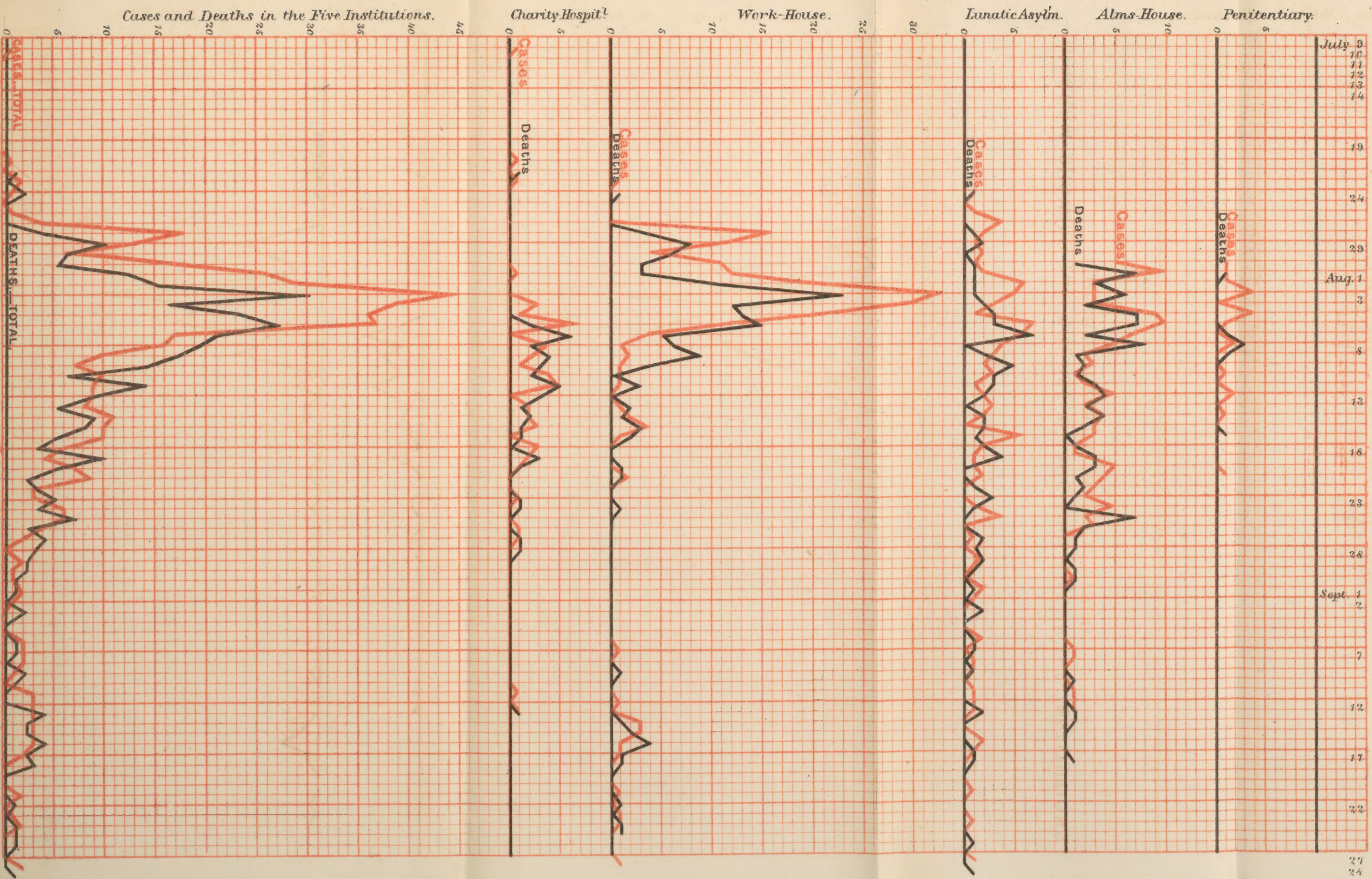


DIAGRAM SHOWING THE COURSE OF THE CHOLERA IN THE INSTITUTIONS
ON BLACKWELL'S ISLAND, 1866.



APPENDIX "K."

Table showing Influence of Age upon Mortality.

AGES.	LUNATIC ASYLUM.				WORKHOUSE.				ALMSHOUSE.				PENITENTIARY.				CHARITY HOSPITAL.				TOTAL.			
	Males.		Females.		Males.		Females.		Males.		Females.		Males.		Females.		Males.		Females.		Males.		Females.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Under 20.....	.....	1	1	8	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20 and under 30	4	4	13	11	17	12	53	36	4	3	15	12	10	3	1	1	1	1	1	1	1	1	1	1
30 and under 40	7	6	24	18	12	9	27	19	2	2	20	15	3	3	1	1	1	1	1	1	1	1	1	1
40 and under 50	5	3	18	11	17	12	22	18	2	1	12	10	1	1	1	1	1	1	1	1	1	1	1	1
50 and under 60	6	3	9	7	7	7	11	10	8	4	18	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
60 and under 70	2	2	6	5	10	9	4	3	5	4	9	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
70 and under 80 ....	.....	.....	1	1	1	1	2	2	2	2	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
80 and upwards.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unknown	1	.....	1	.....	2	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	25	18	73	54	72	53	132	96	26	18	85	72	16	7	3	.....	18	15	32	27	157	111	325	249

